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Jobs for Everybody

"I SEE by the papers," as the renowned Mr. Dooley used to say, that the President is planning things so that everybody will have a job. In the British Isles, I found that the politicians were holding out the same promise.

Of course, this doesn't really mean everybody because there are quite a few persons both here and abroad who are not able to work and some who do not want to. I presume that the state should be limited to those who are both able and willing.

What pay will accompany the jobs that carry over and those that have to be created through public funds is not stated in either country. This is an important question since war demands here as well as abroad have resulted in considerable upgrading because of acute manpower and woman power shortages.

As a concrete case, about a year ago I was instrumental in getting a job for a husky lad of 17 who had finished a year's course in a technical high school. He was a fairly average boy for his age but not overly bright and in normal times would be worth about \$18 a week in any employer's money. In the war plant that hired him, he was given a short training course as a turret machine operator and then turned loose on his own. Shortly afterwards, being grateful for the slight assistance I had rendered, he called and showed me his current week's pay check. It was a little over eighty dollars.

Now I do not say that this young man was overpaid for doing his part in helping to win the war. No price can be put on victory, or at least not a money price, that is too high. But whether a postwar, peacetime economy, with competition re-entering the picture, can afford to pay a schoolboy the same compensation as a college professor is another question. If that were so, I think it would be high time to upgrade the professors.

This matter of the relative compensation of an individual for his or her contribution to public interest in the postwar world is indeed a difficult problem. You will find that the politicians, who speak so eloquently of full employment, will dodge the issue, except as it applies to pronounced majorities of constituents in their bailiwicks. But no one can solve our postwar problem on working hours alone; an additional requirement is the consideration of wages in determining national purchasing power. And unless the product of these two factors fits the pattern of realizable national income, we are committed to a further headlong dive into deeper national debt.

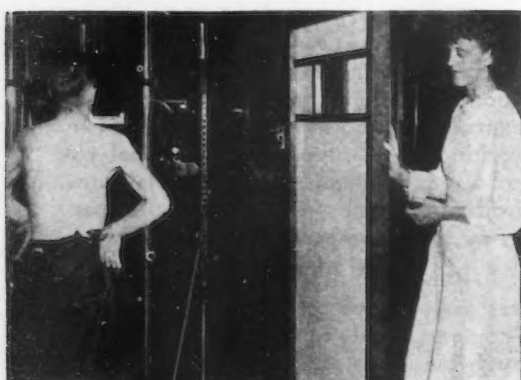
But coming back to this subject of a job for everybody, or full employment, I would like to relate a comment made to me by a Scotch steel-maker who was showing me through his plant. Like most steel plants, or in fact plants of every description, there are times when it is necessary to call in extra help to do certain odd jobs. In this plant there were forty or fifty casual laborers engaged in dismantling an open hearth. Said the Scotsman: "When everybody has a steady job, as our government promises, where in the world will I go to get work of this kind done?"

J. H. Van Deventer

Inland medical staff discussing an X-ray film.



Blood tests often suggest corrective treatments that keep men at work.



The X-ray is extremely useful in preventing the loss of man-hours.



The knowledge of heart action is useful in placing workers and extending their work years.

INLAND CLINIC HELPS SOLVE MANPOWER PROBLEM

The Inland clinic, established long before Pearl Harbor, has taken on added importance during the war by helping to solve the vital manpower problem.

Working closely with the Inland industrial relations and safety departments, the clinic appraises the usefulness of many handicapped people—suggests types of jobs they can perform,—helps find work they can do in the Inland mills to replace workers who have gone to war.

The clinic staff speeds men back to jobs by assisting them in obtaining needed outside medical attention. It recommends and arranges for special treatment. It helps find medical service for workers new in the vicinity and for those whose regular physicians are away at war.

The 24-hour dispensary provides medical attention quickly and keeps many a man producing who otherwise might be absent from work because of slight injury or minor illness.

Finally there is the regular clinical work—free examinations that forestall illness, prevent accidents, speed the recovery of injured and sick employees. Although not compulsory, all but a very small percentage of Inland employees have taken advantage of this service.

Through its important work the Inland clinic has literally added thousands of man-hours to America's war effort, bringing Victory that much sooner.



INLAND STEEL COMPANY

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► Widely publicized expectation of a sharp drop in steel plate demand for ship construction in first quarter does not have basis in fact. Present plans call for no relaxation of the maritime program for that period.

► Congress will soon press through a bonus arrangement for war workers in order to keep them on the job until victory in Europe. Those workers sticking until discharged by a particular war plant will receive a cash bonus figured on time interval from the passage of the bill.

► The step-up in the heavy shell program is to be accompanied by a related increase in production of gun barrels to shoot the shells, and heavy trucks to get the shells to the front, heavy axles for the trucks, and heavy tires on which to operate the trucks.

► Many truck fleets in France are consuming one large tire per truck per day. Satisfying this demand is throwing a very heavy load on heavy truck tire production facilities.

Therefore: Civilian tire production will be dropped 10 or 15 per cent until this heavy tire program reaches the new and higher schedules.

► While the lag in critical items in the war production program cannot be completely credited to individual causes, the lags do break down approximately for the following reasons: 40 per cent because of step-up in demand; 26 per cent because of design changes; 22 per cent because of labor shortage; and 12 per cent because of lack of facilities.

► Current Congressional interest in the probability of increased industrial centralization because of war plant construction will very likely be followed by some type of action designed, rightly or wrongly, to balk this trend.

► Growing worse is the Negro problem in Michigan plants. Although quiet for a time, strikes have recently occurred at Packard, where Klansmen tried to get control of the Auto Workers Union some time ago over racial issues.

Reports are that more and more employees—both Negroes and hillbilly whites who came to Detroit in search of high wages—are carrying knives on their persons. Detroit is worried.

► At least one automobile engine will be built in the fairly immediate postwar period of secondary aluminum say trade reports out of Detroit.

► Concentration on development of fuel injection to replace carburetors is the research problem common to most automotive plants. But so far even the simplest fuel injection, using a central pump, costs so much more than a carburetion system that it cannot even be thought about.

► Curtiss-Wright's decision to build a postwar commercial air transport may result in some juggling of business among the larger transport makers. Lockheed and Douglas, for example, buy engines from Curtiss-Wright. The aircraft industry would not be at all surprised to see one of these producers shift its power plant purchases.

► A pilot two-high rolling mill has been installed in the Research and Development Laboratory of the Jones & Laughlin Steel Corp. It will be utilized in physical research in strip rolling.

► Donald Nelson's new position as personal representative to the President in dealing with foreign governments is believed by some government officials to be the precursor of the creation of a federal commerce agency similar to the British Board of Trade.

► A new problem to vex the steel industry is the increased military requirements for galvanized sheet. Manpower, not facilities, will be the bottleneck on this program.

► Just completed are negotiations for \$4,000,000,000 worth of textile machinery to be supplied by this country for shipment to Egypt. Orders for additional machines will be placed here as long as present delivery dates prevail, but the United Kingdom will get the business lathes and other standard type machines.

American firms have promised the Egyptians delivery in 11 to 12 months. This has been bettered by Swiss tool builders, but insolvable transportation problems preclude such trade.

... Deep Drawing and Forming of

MAGNESIUM alloys in sheet and plate are present day leaders in light weight metals which combine strength factors with utility. Once the cost is brought down to an economic level, postwar production will be demanding magnesium alloys in ever-increasing tonnage for the fabrication of components in metal products whose present excessive weight militates against greater sales volume. The extensive use of these products suffers through high freight rates in interstate transportation and time lost in handling the weighty items in shops, offices, stores and homes.

Limited attempts have been given to committing in writing* the facts

* An experimental study is outlined in the article: "Hot Forming of Magnesium Alloy Sheets," THE IRON AGE, July 27, 1944, p. 43.

and experiences gained by engineers in their research and development work in fabricating deep drawn parts from magnesium alloys in sheet form. This is to be regretted since sheet and plate magnesium alloys present to metal goods manufacturers an immediate solution to the plastics challenge as well as to other keenly com-

petitive conditions that may be ever-present during the postwar era.

In common with most other metals, yet in contrast to mild steel, magnesium alloys exhibit no sudden, but rather a gradual yielding when stressed. In resilience or capacity for elastic shock absorption, magnesium alloys excel because of their low modulus of elasticity. In this connection, it is interesting to learn that the Dow Chemical Co. has been building complete units of aircraft wings for a trainer plane, and that these magnesium wings have demonstrated the wisdom of their use, not only for strength, but also as being able to withstand for many months exposure to the supposed corrosion of salt air on magnesium parts.

Conclusively, demonstrating the po-

tentialities of deep drawing sheet magnesium from the standpoint of successful commercial stamping practice is the deep and irregularly shaped piece shown in Fig. 1.

Dow Chemical Co. at Bay City, Mich., turns out many highly interesting deep drawn parts from sheet magnesium, a few of which are shown in Fig. 2. All clearly indicate the great advances made by that firm not only in developing suitable magnesium alloy sheets but also the dies and equipment for producing finished deep drawn parts.

In Fig. 3 is shown a deep drawn aircraft part produced by the Dow company of 20 gage sheet. In spite of its irregular contour, narrow width and great depth, in production this part comes out free from wrinkles

FIG. 1—An unusual example of a deep drawn stamping produced hot in one draw. This part was made in 16 gage magnesium by Brooks and Perkins, Detroit.

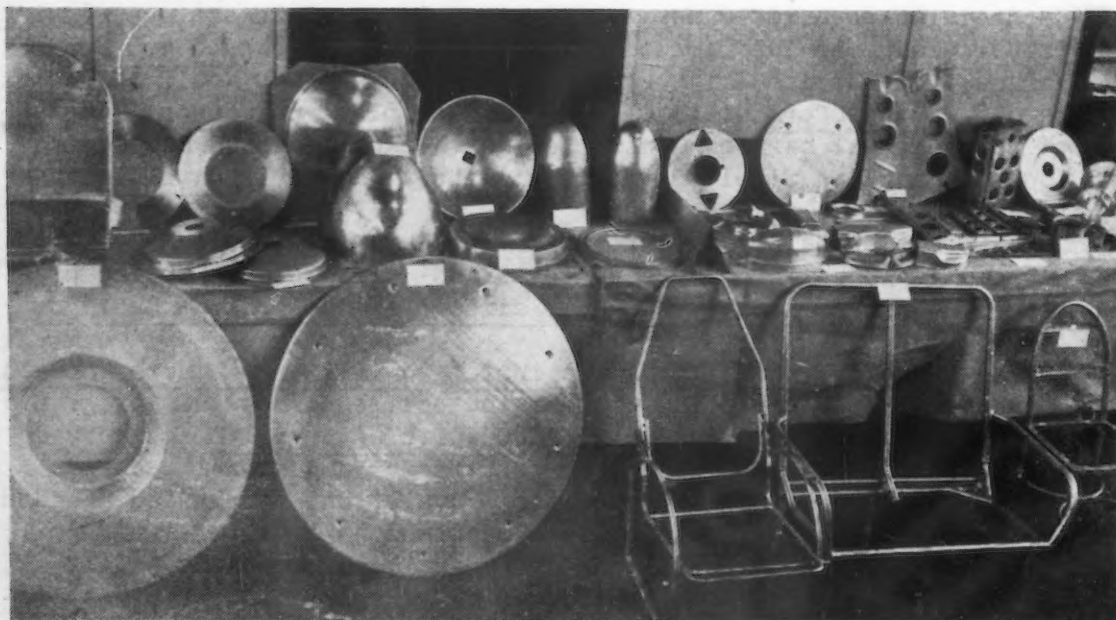
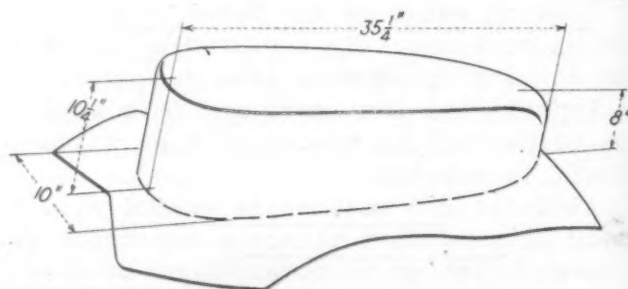


FIG. 2—Parts fabricated from magnesium sheets and tubes by Dow Chemical Co.

Magnesium Sheet

By ARTHUR E. MEYER
Meyer Sheet Metal Machinery Co.,
Los Angeles, Cal.

and with a perfect set in its finished form. The last named quality is accomplished by using heated dies and also heating the sheet itself, thus entirely eliminating any necessity for sizing or otherwise hand finishing these magnesium pressings as would be necessary for overcoming the springback encountered when handling sheet magnesium cold. Fig. 4 shows some interesting tankheads and spinners. The spinner, made of 0.064 in. thick sheet is drawn in one operation to a depth of 15 in. and 8 1/4 in. diameter.

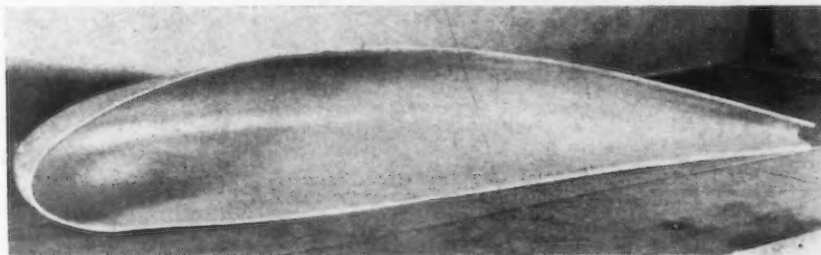
Many production men, unfamiliar with sheet magnesium production, infer that the slight fire hazard encountered in connection with the machining of forgings and castings also applies to sheet fabrication. While there is a slight danger of spontaneous combustion through the accumu-

... Methods for accomplishing deep draws in a single operation, particularly the critically controlled heating of the magnesium sheet and the dies are described by the author who supplements his own experience with an exhaustive study in plants from coast to coast, including magnesium fabrication plants of the Dow Chemical Co., Bay City, Mich., American Magnesium Corp., New Kensington, Pa., and Brooks & Perkins, Detroit.

lating must be heated for all but the simplest fabricating operations. However, whereas "dural" and most other aircraft alloys require hand finishing after being deep drawn or otherwise pressed formed, magnesium parts come from the presses and press brakes with a positive set or finished form. When working sheet hot, tool engineers quickly become as familiar with the springback of this metal as with dural or stainless steel and can safely follow predetermined tables for

either overbending the metal in press brakes or modifying the clearances required between the punches and dies for drawing the sheet magnesium.

It has been definitely determined that where this metal is worked cold or at room temperature it requires four times the pressure necessary for forming or deep drawing duplicate parts from heated sheets of this metal. In addition to this, the metal work hardens rapidly when formed at room temperature. For blanking

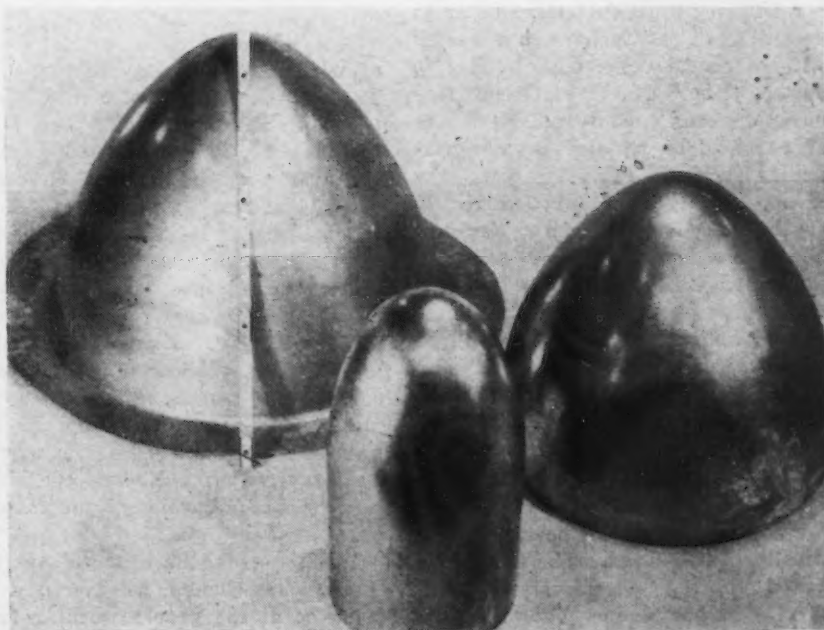


LEFT

FIG. 3—Wing tip produced without wrinkles, measuring 36 in. in length, 7 in. in greatest width and a depth of 11 in.

BELOW

FIG. 4—Nose spinners formed of 0.064 in. sheet in one draw by the Dow Chemical Co.



lation of fine chips or dust particles resulting from grinding or machining of magnesium forgings or castings, the fabrication of sheet magnesium parts is practically devoid of fire hazard. One reason for this is the rapid advance made in equipment for heating this material, progressing from oil to gas and later to electricity. It is true that most sheet parts must be heated before forming, as well as in some cases, annealed between pressings. Although the "hot-shortness" or fluidity of magnesium is reached at a point not exceeding 1200 deg. F. the heating furnaces and controls for heating sheet magnesium particularly have been developed to a point where temperatures can be maintained at ± 5 deg. F. of any desired point.

Due to extreme springback and brittleness, sheet and plate mag-

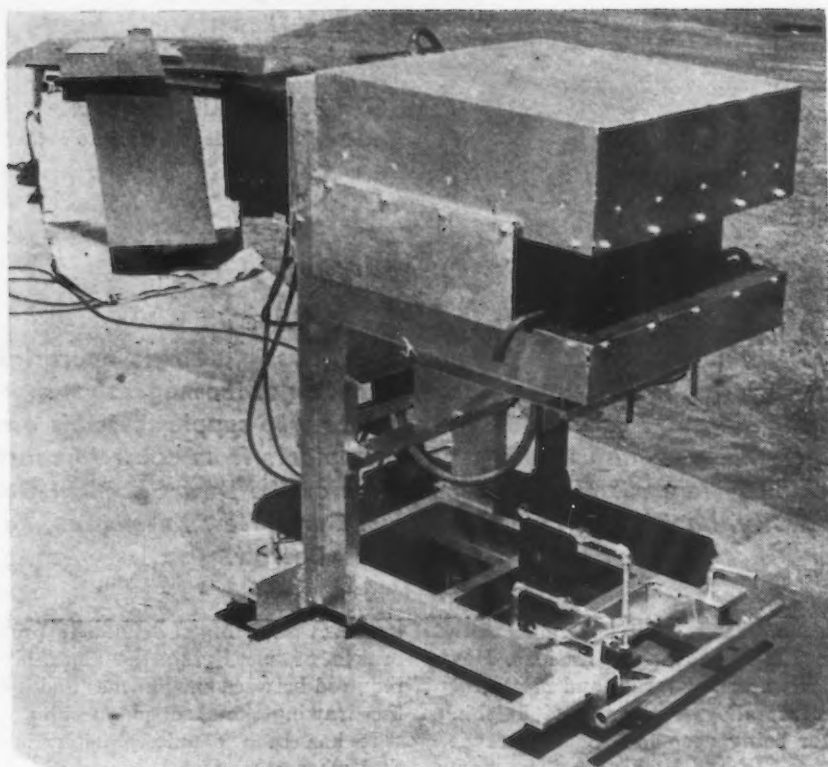


FIG. 6—Contact plate type electric preheater for magnesium blanks developed by Dow. This unit is a portable type using air pressure to bring contact plates together.

annealed sheet and plate the pressure requirement is 16 tons per sq. in., and for hard magnesium, 20 tons per sq. in. of area sheared. In addition to heating the sheet itself, it is also always necessary to heat the dies, a subject which will be discussed later.

Sheet Heating Furnaces

For sheet heating, best results are obtained in electrically heated furnaces, because of more sensitive controls, although gas furnaces are in use. There are several types of electrically heated units in use. One is a refractory lined furnace, similar in design to a gas furnace, but heated with electrical coils, with muffles to protect them. The size of these furnaces depends entirely upon the size of parts to be handled in any particular plant. Fig. 5 shows the Knapp-Lee furnace for electrically heating flat sheets as well as for supplying heat for annealing partially formed work between draws. It generates heat up to 700 deg. F. It has several compartments and, as will be noted, a self-contained gib crane and hoist are also supplied for handling heavy sheets in and out of the furnace. This furnace is built by the James H. Knapp Co., Los Angeles.

The Dow Chemical Co. has also developed a number of portable electrically heated units. The unit illustrated in Fig. 6 consists of two 36 x 36 in. box shaped platens, inside

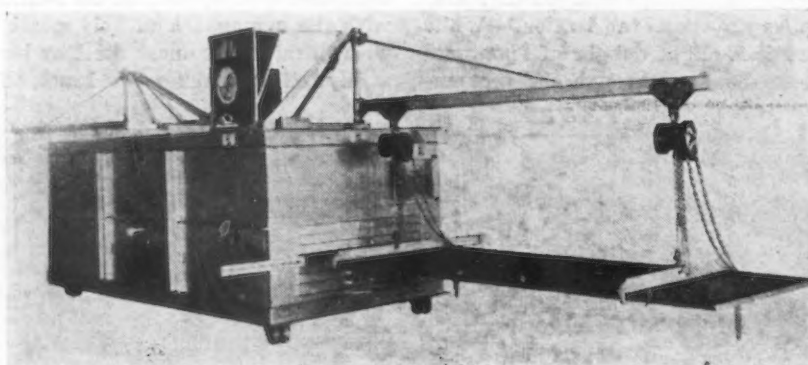


FIG. 5—Knapp-Lee electrical heating and annealing furnace for flat sheets.

of which are electrical heating coils. The controls are mounted in a handy position on a structural frame. The top platen is fixed and the lower one is movable up and down by air cylinder and piston.

The operator takes each blank from the stack on a truck, coats it with a lubricant and lays it on the lower platen of this heater. Opening the air valve, elevates the lower platen and moves the blank up to where it contacts the heating face of the upper platen, and after being held in this position for 15 sec., the unit is opened by a reverse air valve and the blank removed and immediately put into the press.

When working hard or "h" temper sheets care should be exercised in doing so at the proper working tem-

perature so as not to adversely affect the temper of the sheets and the grain of the metal. On light gage sheets of "h" temper, certain alloys should be worked at no more than 275 deg. F., while others can safely withstand 400 deg. F. Certain other magnesium alloy sheets above 0.060 in. thick can be worked as high as 500 deg. F. When working with soft or annealed sheets these can be heated to as high as 650 deg., but by no means over 700 deg. F. Beyond 700 deg. F., depending upon the alloy used, the danger of "hot-shortness" is encountered. Sheet thicker than 10 gage, as well as plate (all magnesium thicker than 1/4 in. is termed plate) is furnished hot rolled, and the temper is intermediate between that of ordinary or soft annealed and the hard rolled sheet.

Constant careful supervision should be given to heat control, as working the sheets or shapes, either hard or soft, beyond the ranges mentioned may affect the temper of either the annealed or the hard rolled sheets. On all but the simplest shallow draws of symmetrical shapes, the magnesium must be annealed between draws.

Compared with other metals, annealed magnesium sheet when hot formed can be drawn deeper per draw than any other sheet metal in the same gages and shapes.

Heating the Dies

Dies should be heated for practically all drawing and bending, excepting open bends made on press brakes, and in the latter case, only when the bend allowances for radii will permit bends being made cold without fracturing the sheet or strip.

On both mechanical and hydraulic presses, sufficient insulation should be installed between the ram or upper die and between the bed and the lower die. This insulating can be done by using either Transite or similar material of about 1/4 in. thickness. Stain-

less steel also works out satisfactorily. Laminations of perforated stainless sheets or strips of 28 gage are stacked above each other between the press members and the dies to a thickness of about $\frac{1}{4}$ in. with the holes in each strip or sheet staggered with respect to those in the next strip or sheet.

Press brake dies, because of their narrow front-to-back dimensions, are best heated by a unit strip heater, such as a Calrod heater, with a connection at each end of both the punch and the die. When mounted on the exterior of a punch or die, the electrical heating element must be well insulated thermally, not only to retain the heat on the dies, but also to protect operators who might come in contact with the heater coils.

The method for heating drawing dies is by means of gas, having all burners fitted with flexible connections and hoses sufficiently long to permit the burners to travel up and down with the press slide and blankholders. Suitable pressure gages and heating thermocouples should also be provided for each of the heated members. The heat applied to heated punches and dies can be 150 deg. F. less than the heat used for heating the blank to be drawn. Fig. 7 illustrates the gas heating method for the wing tip die which performs the drawing operation on the parts shown in Fig. 8.

Fig. 9 shows the arrangement of a series of burners applied to a set of drawing dies used by the American Magnesium Corp. Care must be exercised not to locate these burners too close to the surface to be heated, in order to prevent the flame itself from affecting the metal being drawn. Each burner should be fitted with individual pyrometer and controls.

Pancake Type Dies

Where boiler plate is used either for blanking or forming punches, it is advisable first to take a rough machine cut on the plate and then to anneal the parts, before taking the finish cut. Otherwise, such dies are likely to warp when put into use in producing hot worked magnesium. These inexpensive blanking or trimming dies may be employed for producing limited quantities of pieces, but high carbon tool steel punches and dies are recommended for quantity production. Magnesium blanking, trimming and perforating dies should be arranged with minimum clearances between punch and die to insure perfect shear cut edges. If punchings of 0.064 in. or heavier metal come out with noticeably burred edges these can be eliminated by heating the sheets to as high as 500 deg. F.

While tool steel is satisfactory for any drawing dies, there is a tendency, particularly for steel blankholder and

pressure rings, to warp when operated on long runs of heated sheet magnesium. The best results on drawing dies for heated magnesium are obtained with either electrolytic cast iron or Meehanite iron. Ordinary gray iron is unsatisfactory and will both corrode and warp when operated on heated magnesium. The remarks just made about cast iron apply also to blankholder plates and pressure rings.

Press brake dies or plain bending dies for working annealed sheet or strip cold should be machined with a radius of from 4 to 7 times the thickness of the metal to be bent, the radii varying according to the magnesium alloy used and the sheet thickness. For making such bends hot on identical alloys the radius need only be twice the thickness of the metal. When making similar bends on "h" temper sheet or strip the bending radii should be twice those used for bending the equivalent thickness of annealed magnesium.

Eliminating Springback

To overcome the inherent springback of magnesium the parts are first only partially bent in the dies by bringing the ram and dies against the metal sheet part way. Again throwing in the clutch, ram and dies are brought farther down on their stroke, bottoming on the metal and

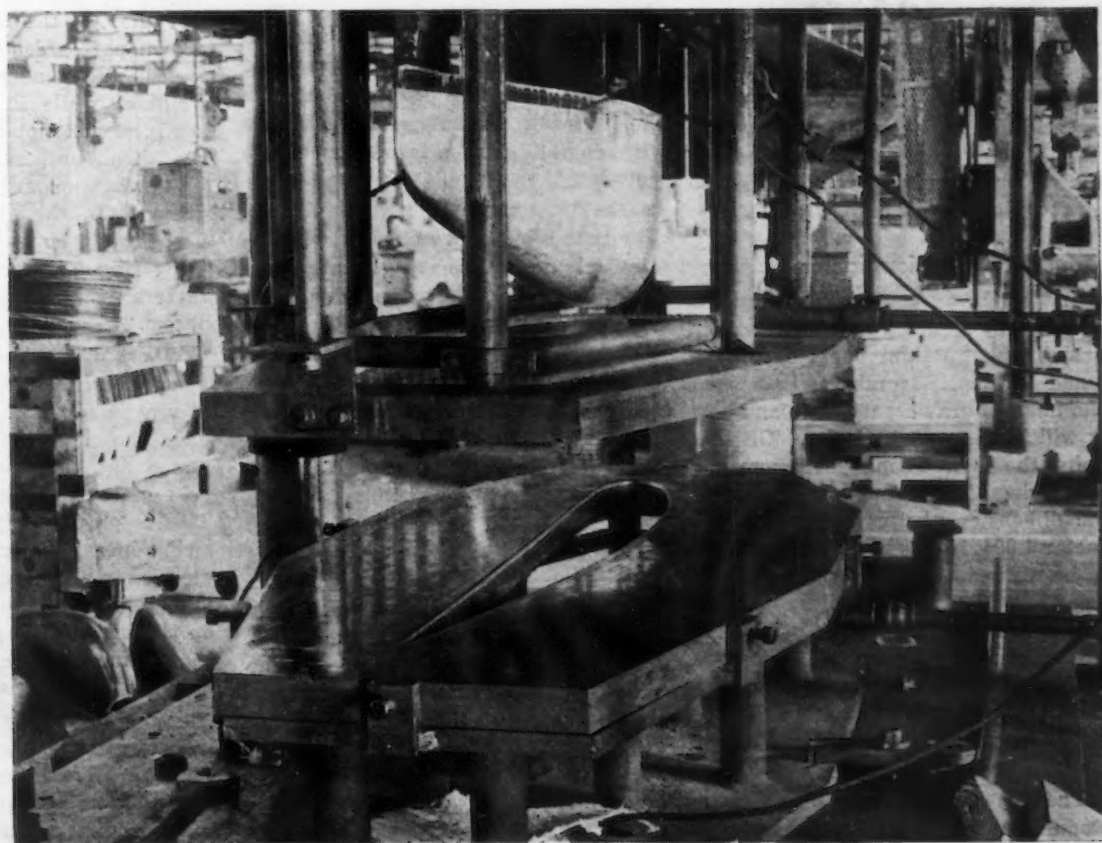


FIG. 7—Gas heated dies for forming wing tips in one draw. Note elevation of gas burner ring above the draw ring and below the punch member.



FIG. 8—Wing tips formed of 0.040 in. magnesium by Dow Chemical Co. in the heated die shown in Fig. 7.

completing the cycle or stroke of the press brake. While this is actually one stroke or cycle, such handling actually strikes the metal in two strokes. Springback is thus eliminated since the molecules in the grain structure are permitted to move and conform to the shape of the dies.

Whether bending the sheet cold in press brakes or in mechanical or hydraulic presses, the springback of this metal must never be overlooked. The sheet should never be worked in presses at a speed higher than 200 ft. per min. travel of the ram on the heavier gages, while on the lighter gages the speed can be cut down to as slow as 75 ft. per min. to permit the metal to assume its finished shape or set without tearing.

Expansion Factor

Inasmuch as magnesium expands three times as much as steel, dies for drawing magnesium parts should be made sufficiently oversize so that when the finished drawn part cools and sets it will be the required size. On this point the Dow company recommends that when laying out steel dies all die dimensions be multiplied by the factor 1.004, if dies or form blocks are to be worked at a temperature of 600 deg. F. If aluminum dies or form blocks are used instead of steel, this factor should be 1.0017. If magnesium alloy dies or form blocks are used, these should be made to the desired dimensions of the finished drawn magnesium part.

There is a tendency for deep drawn stampings to be thicker along the

upper part of the vertical walls of any shape being drawn. Excessive clamping pressure makes it difficult for the metal to properly flow into the die, resulting in thinned walls and frequent tearing of the drawn part. Blank holder pressures required for drawing magnesium sheet will vary from 70 to 200 lb. per sq. in.

Dies for this work should be operated in either a geared mechanical press or a hydraulic press of suitable capacity. Either press, however, should for best results be double acting—the double acting feature being provided either in a press with a blank holder and a drawing slide, or with a drawing slide and a large air cushion in the bed to provide proper pressure to the draw rings. Where the Guerin (or rubber pad) process is used, particularly on parts having a large surface area, it should be borne in mind that this method requires about 1000 lb. per sq. in. pressure. Due attention should be paid to not only installing presses with ample stroke and die space, but also having amply large bed and ram or platen areas, together with air cushions of ample capacity.

While the general design of drawing dies for magnesium sheet does not differ materially from that for other metals, all such dies should not only be highly polished on all contact faces, but always kept well lubricated. The cross-sectional areas of all die shoes, draw rings, blank holder plates and punches should be ample to withstand the pressures mentioned previously, as well as to resist warpage at the elevated temperatures at which such dies

will be operating the greater part of the time.

Die Corner Radii

Opinions vary as to the radii best suited for the corners of the punch and the inner edge of the draw ring over which the sheet is drawn into the female dies. A safe practice is to use a radius of about $\frac{3}{8}$ in. both on the draw ring and the punch. These radii are controlled to a marked degree by the depth, diameter or if irregular, by the shape of the finished drawn part. Too large radii will increase the tendency to pucker or wrinkle; while if this radius is too small, it will not only gall or indent the metal, but, in many cases, cause it to tear or fracture while being drawn into the die. Machining the proper radii on both blank holder and draw ring are two of the most vital factors making for successful deep draws.

Where it is desirable to maintain an even thickness on the vertical walls of any stamped or deep drawn sheet part, the clearance between the male punch and the female die should be held close to the metal thickness. This is particularly true for final or sizing operations on drawn parts. The die maker will frequently find that it is more desirable to change the radius on the inside of the draw ring rather than to increase the clearance between male and female parts of the die.

Sizing of magnesium drawn parts is done in the same manner as sizing of other pressed metal parts except that where magnesium is worked cold the springback must be considered in

the design of the sizing punch and die.

Greater attention is being paid to the proper type of lubricants used on both the drawing dies and the metals being drawn in them, as the absorption or adherence of lubricants to steels is an important factor in the successful drawing of deep drawn parts. This absorption may be so aggravated as to permit caking or clogging of the press of the die, preventing proper flow and stretch of the sheet metal. This will become readily apparent by the increase in the number of torn or fractured stampings. For lubricating the magnesium sheet Achison colloidal graphite has proven highly satisfactory. Another good mixture consists of beef tallow and 20 per cent graphite. For lubricating dies, admirable results are being obtained with Lennox soap solution and good brands of heavy machine oil.

Hot Pressing vs. Die Casting

Old time automotive sheet metal production engineers and die makers will doubtless recall the extruded copper tubes used in automobile radiators and produced under the old Hooker patents. They anteceded the press formed square ribbed sections formed out of a continuous strip of copper. These extruded round tubes were produced by first making a dead soft copper cup having thin side walls and a heavy flat bottom. The cup was then inverted and the copper was forced through a very thin opening in the lower die in a coining press. The cup was confined in a collar surrounding the opening in the die to prevent any horizontal flow of the copper. As the ram and punch descended to the flat bottom of the cup it forced the copper to flow through the opening, forming a tube about 14 in. long and having a finished, paper-thin wall. Yet the stroke of the coining press was only 2 in.

Recently the American Magnesium Co. produced high pressure magnesium tank flanges from heavy magnesium plate, using dies and methods similar to those used for the old round copper radiator tubes just mentioned. The tank flanges were all round, of different thicknesses of both side walls and horizontal cross-sections. The first step in their production was blanking a round disk of the proper diameter and of a thickness to provide enough metal to produce a finish formed flange of the desired cross-sectional dimensions and density. The punch for the next operation, forming, was flat and the die was machined with the desired impressions in

it, the same as in an ordinary finisher impression in a drop forging die. Laying this thick plate slug inside of a collar on the top of the lower die, the clutch was then engaged and the downward movement of the ram and punch forced the heated slug to flow into the die and to follow and fill in the full contour of the die. Here again, although one of the flanges had a side wall about 3 in. deep, the press stroke was only 2 in.

The finish formed piece, Fig. 10, had the appearance of a die casting and, like the latter, required no machining operation for finishing. It had decidedly greater density and strength than a die casting. Forgetting even the lower production cost of this hot pressed part, the possibilities of extensive use of this method for producing countless magnesium shapes requiring high tensile and shearing qualities immediately become apparent.

Shearing Sheet

Magnesium sheets under 0.102 in. thick can be sheared cold. Above the thickness specified it is advisable to heat the sheets to about 500 deg. F. immediately prior to shearing, as in this or thicker gages considerable burr will be encountered along the sheared edges due to the peculiar grain structure of sheet magnesium alloys.

The standard grade of shear blade used for shearing all other metals is suitable for shearing magnesium. However, for best results it is advisable that the upper blade be made with only $\frac{1}{8}$ in. rake or taper per ft. (instead of the conventional 5/16 to $\frac{3}{8}$ in.) and that its horizontal or lower face which comes in contact with that part of the sheet that is being cut off have a taper or relief angle of 30 deg., instead of the usual

$1\frac{1}{2}$ or 2 deg. See Fig. 11. An upper shear blade made to the above specifications insures maximum flatness and the burrless cuts. The lower shear blade should be ground either flat or not to exceed $\frac{1}{2}$ deg. taper from the bedline to its backface or that face which comes in contact with the upper blade. Shear blades should be kept well lubricated, either with a good light machine oil or even kerosene.

Shear blades for any gage of magnesium should be set in the shear with their vertical contact faces set up more closely than for other metals, and the clearance between these two faces should be from 0.001 to and not exceeding 0.003 in. Sheet over $\frac{1}{4}$ in. thick is best cut on a band saw, with blades the same as used for band sawing other non-ferrous metal sheets.

When cutting or trimming with Beverly or any other type of hand shears having short blades, care must constantly be exercised not to cut to the end of the blade, as this is likely to leave lateral cracks that might result in potential fractures.

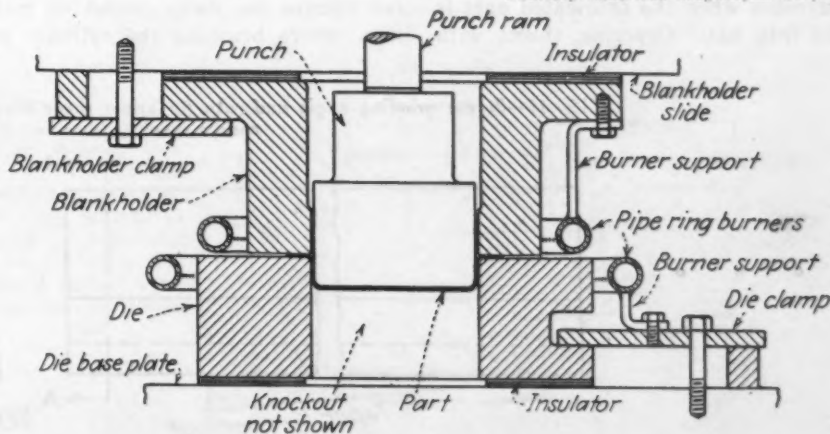
Scratching, scribing or otherwise marking magnesium with any kind of a sharp tool is also likely to indent or fracture magnesium, hence the use of such marking means should be forbidden. All marking should be done with pencil, crayon or similar means.

Guerin Process

While the Guerin process was originally developed for aircraft sheet metal production, it readily lends itself to the production of sheet magnesium parts. It is necessary to spray the magnesium blanks with cornstarch or other substance to prevent the formed part adhering to the rubber pad. While the powder method is widely used, the Dow Chemical Co. has had better success by laying a

FIG. 9—Cross-section of gas heated die for drawing sheet magnesium.

Courtesy American Magnesium Corp.



thin piece of wrapping paper between the metal blank and the rubber pad to prevent sticking.**

** See two-part article: "Designing Rubber Press Tools," in *THE IRON AGE*, Sept. 14, 1944, p. 50 and Sept. 21, 1944, p. 59.

The paper also keeps any gritty material being worked into the rubber pad. Except when forming shallow parts in light gage sheet magnesium, it is necessary to heat the metal to be formed, just as is done when the sheet is formed or drawn in male and female metal dies. Whether the blanks are heated or not, it is necessary in the Guerin process to heat the metal punch. This can be done either with a gas heated bolster or pressure plate. The latter can also be heated with a series of Calrod or other coil heaters.

For working sheet magnesium, rubber pads of 70 durometer hardness are suitable for temperatures between 250 to 350 deg. F. But for greater temperatures up to 450 deg. F., Good-year Chemigum or similar synthetic rubber is more suitable and longer lived.

Where panels or other box shaped pieces have 90-deg. bends are made in sheet magnesium by the Guerin process, the vertical walls of the forming punch should be sufficiently cut back to allow for the springback. When the pressure is removed from the formed blank, the finished piece will then have a set or finished form shape of the required angle, thus eliminating any hand finishing or shaping.

Rolling Cylinders of Magnesium

For rolling cylindrical shapes of sheet and plate magnesium the same types of rolls used for making cylinders of other metals can be used. The surfaces of the rolls must be perfectly smooth in order to prevent scratching or indenting sheets being rolled. Any scoring or scratching presents a potential point of fracture as well as corrosion when the fabricated part is put into use. Covering sheets with

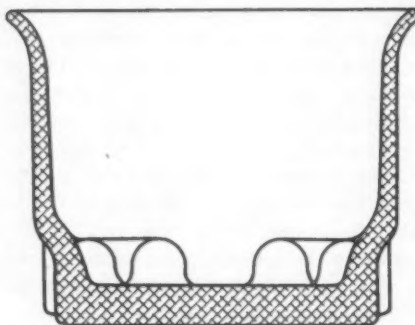


FIG. 10—Cross-section of a hot pressed magnesium part of varying thickness. Like a die casting which it resembles it requires no machining operation.

heavy paper while they are being rolled (or sheared) also helps eliminate the possible scoring.

The commercial practice of removing flat spots from the butted edges of the longitudinal seams of formed cylinders by either hammering or peening should not be resorted to on any cylindrical shape rolled in sheet or plate magnesium. Hammering work-hardens magnesium and may seriously affect the strength of the cylinder. Flat spots on magnesium should be eliminated by either of two methods before rolling into cylindrical shape. The desired radius along the two edges forming the butt joint can either be preformed in an inexpensive cast iron radius die, in one or more strokes of a press, or by the Bertsch pre-rolling method. Using the latter method, one of the edges is inserted into the rolls through the back of the rolls and rolled through just far enough to form the radius a sufficient distance to insure eliminating the flat spot. Then, backing the sheet out of the rolls, the same pre-rolling is done on the opposite edge of the sheet. Following this the sheet is rolled in the regular manner.

Magnesium sheet or plate should not receive too many passes or rollings before bringing the cylinder to

the finished diameter, nor should the sheet be moved through the rolls at too high a speed. Otherwise the grain structure and ultimate strength may be affected. Particularly in rolling heavy gage magnesium plates it is advisable to heat the plate, as rolling magnesium hot eliminates springback in the rolled shape.

Magnesium strip up to 0.102 in. thick can be rolled cold with entire success into many difficult cross-sectional shapes on multiple roll forming machines at the same surface speed as used for strips of other metals.

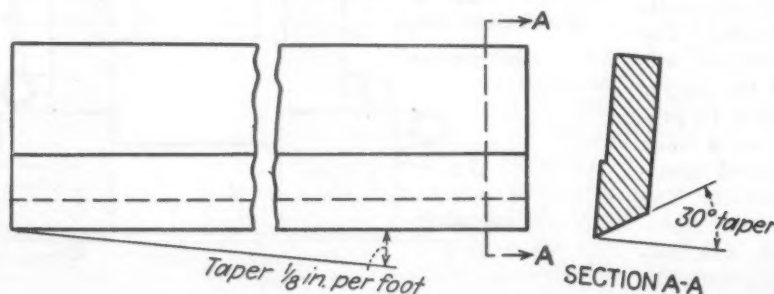
Drop Hammer Stampings

Inasmuch as sheet magnesium work hardens under repeated hammer blows, only the shaping of simple contour forms or shallow symmetrically shaped parts should be attempted under drop hammers. It is advisable to heat the sheets to around 450 deg. F.

While the manufacturers of Kirksite have gone a long way in helping American industry with an inexpensive female blanking die material, they have not to date perfected any forming die material suitable for deep drawing heated sheet magnesium, as the latter is frequently heated to as high as 650 deg. F. This temperature is quite close to the melting point (717 deg. F.) of the hardest Kirksite yet developed. Kirksite dies have been used for forming sheet magnesium aircraft parts heated to 450 deg. F. Morris P. Kirk & Co. is endeavoring to develop a grade of Kirksite that will be suitable for drawing sheet magnesium at the highest temperatures used for the latter. It is interesting to note here that for blanking dies a rolled Kirksite bar having 60,000 lb. per sq. in. tensile strength has been developed.

Reference should also be made to the extensive use that is being made of Masonite for forming and drawing sheet magnesium, both hot and cold in the Guerin process, as well as in male and female dies.

FIG. 11—Proper grinding angle and rake for upper shear blades on shears for magnesium sheet.



Plastics Injection Molded Up to 16 Oz.

A SIXTEEN ounce capacity plastics injection molding machine that incorporates many new developments and operating refinements for the injection molding of thermo-plastic material has been introduced by the Hydraulic Press Mfg. Co., Mount Gilead, Ohio. One of the novel design features of the machine is a hydraulic mold clamp which consists of a double-acting ram, equipped with a small internal booster ram of new design. The booster ram closes the clamp platen to within a fractional part of an inch of the total clamp stroke and at this predetermined position, maximum hydraulic pressure is shifted to the large ram area. This arrangement permits practically all of the clamp travel to be accomplished by the use of the fast closing booster ram. Forward mold clamp ram travel is limited by hydraulic bypass arrangement eliminating the need of a stop collar on the tie rods. On the return stroke, the mold clamp is adjustable to any position within the limits of the clamp ram travel, permitting the shortest possible mold clamp movement.

The injection chamber, illustrated, is provided with a two zone heating system and uses electric band heaters with temperature controls. The design provides the means for maintaining a definite differential between each zone. Feeding of the molding material into the material feed chamber is automatically proportioned to the output of the material required. Return movement of the injection plunger pushes material into the feed chute from which it drops into the feed chamber. This insures a continuous uniform flow of molding material enabling more rapid flow cycling without the danger of overheating or burning the material.

By separating the two heating zones with an insulating air gap, it is possible to maintain a differential of 100 deg. F. between them. Maintenance of a higher temperature at the rear of the chamber, reduces the cooling time, after the material has been injected into the die, and permits a faster overall machine cycle.

The torpedo is also heated. As a result, molding material is heated from

the inside as well as from the outside. Faster plasticization is the direct result of this two-way heating feature. Suitable disconnecting plugs are provided for thermocouples and heating bands and two Wheelco indicating temperature controls are provided, one for each zone. The machine has a plasticizing capacity and a hopper capacity of 100 lb. per hr. A

maximum of 16 oz. of material can be injected per cycle.

Injection molding is said to be the most successful and widely used method of molding thermo-plastic resins such as cellulose acetate, cellulose acetate-butyrate, polysterene, acrylics and vinylidene chloride. Great postwar possibilities are predicted for the process.

FIG. 1—The new Model 350-H-16 H-P-M plastics injection molding machine. Rated capacity—16 oz. per cycle.

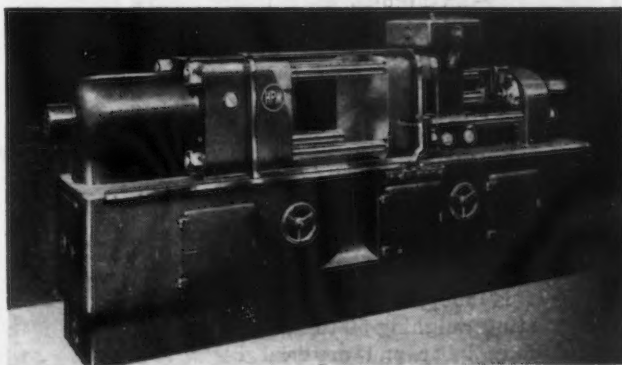


FIG. 2—A sectional drawing illustrating the design details of the H-P-M straight-line hydraulic mold clamp unit used to seal mold halves during the injection cycle.

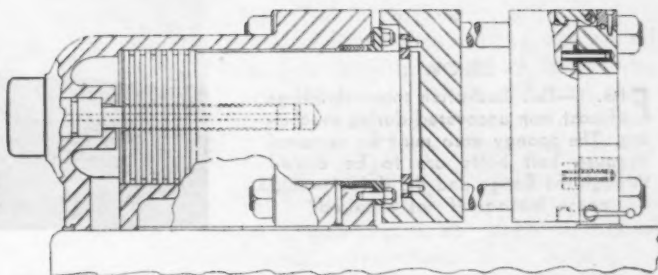
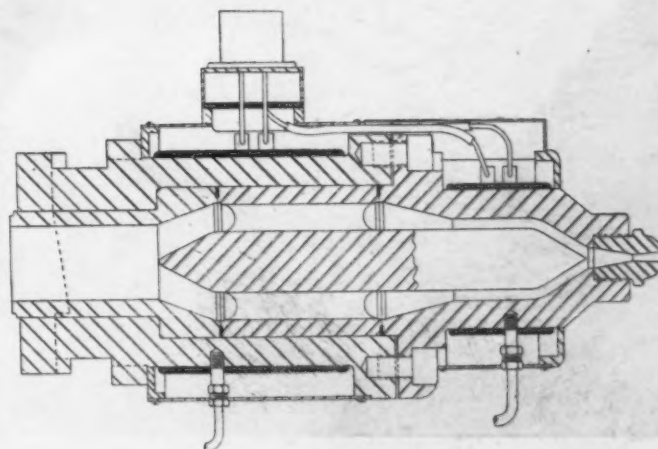


FIG. 3—A sectional drawing illustrating the new H-P-M material heating chamber used to plasticize the molding material prior to injection into the sealed mold.



Salvaging of Large Cast Iron Castings

By H. O. QUARTZ

Welding Engineer,
Allis-Chalmers Mfg. Co., Milwaukee

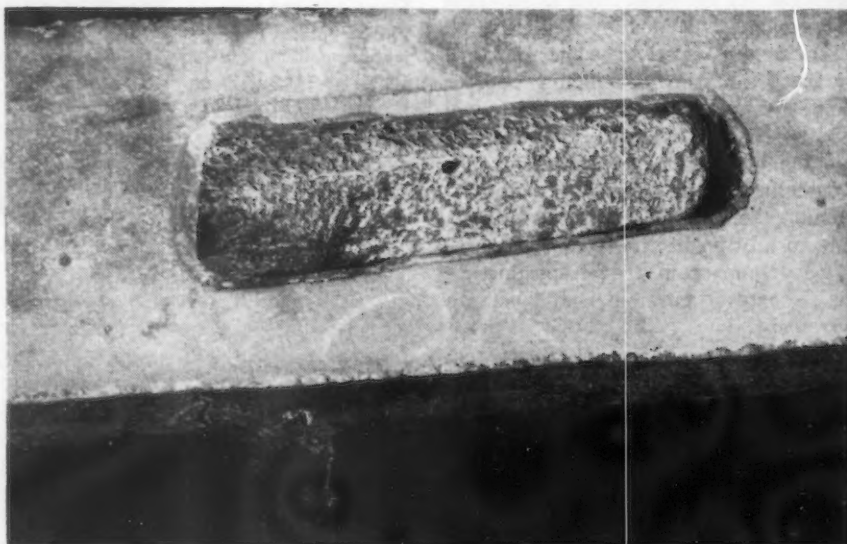
... Defective castings weighing up to a few hundred pounds are often more economically scrapped than repaired, particularly if they are being turned out in large quantities. Castings weighing up to 100 tons and taking weeks to mold and pour, however, cannot be so readily thrown away if defects appear. With the customer's approval, one of several methods can be employed to salvage many of these large castings. Arc and gas welding as well as "burning" are illustrated in these pages.

ONE would hardly advocate repairing an automotive cylinder block casting with a blow hole in the water jacket. Castings for large machinery custom made one or two at a time pose a different problem when defects occur. It may have taken six to eight months to prepare the drawings, make the pattern, mold it and make the cast. The customer in the meantime is waiting for the unit and may need it to keep the plant in operation. It is not unusual to pour a single casting weighing 50 to 100 tons. The molding labor and material required to produce such castings are in proportion to its size; hence consider-

able expense and effort is justified to save these large castings if possible when some mischance produces a serious defect. If after careful examination it is found that the casting can

be repaired and guaranteed the same as if no defect existed, the customer is so informed and his consent obtained for the repair. If there is any doubt as to the feasibility of a repair, the casting is scrapped. As the accompanying photographs show, some of these repairs may be really drastic compared to what is encountered in general foundry practice.

Careful and thoughtful planning must precede the selection of materials to be used in making the repair. Engineers, chief inspector, foreman and superintendent and all interested



BELOW

FIG. 1—This illustration shows shrinkage of cast iron uncovered during machining. The spongy area must be removed because bolt holes are to be drilled through the flange and the defect would cause leakage if not repaired.



ABOVE

FIG. 2—Here dirt and porous metal have been removed from the shrink pocket before drilling and placing of studs.

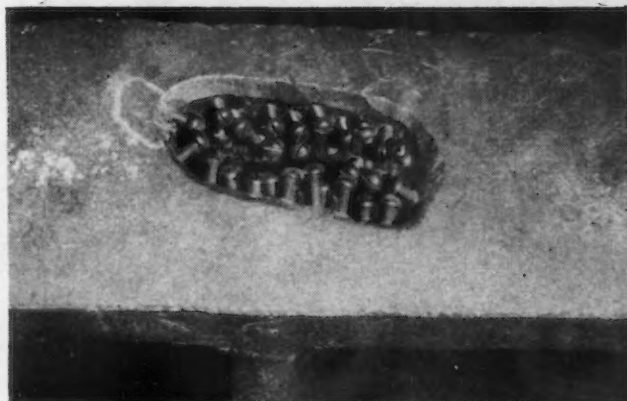
parties are called into a meeting and a plan is worked out as to the procedure to be followed in the repair of these castings. It may be necessary to use oxy-acetylene, electric arc or perhaps the "burning" method. In welding these large castings, it is necessary to use large and heavy equipment such as 50 to 100 ton cranes, large box annealing furnaces and heavy cables or chains.

The welders who do the most important welding on cast iron castings, either electric or oxy-acetylene, are men that have had 12 to 15 years' experience—men who are not afraid of heat and will stay with a welding job as long as it is humanly possible. Sometimes three to four men work in relays for as long as they can stand the heat. The men should know how to handle any specially designed casting and not make any extra moves. They should always make sure that everything is safe and all equipment ready to use to the best advantage since time and temperature play a large part in governing the success of a repair of this kind. These men are equipped with modern safety clothing—goggles, screen heat masks, asbestos gloves—and always have a fire extinguisher ready in case it is needed for any emergency.

In the welding of cast iron with the

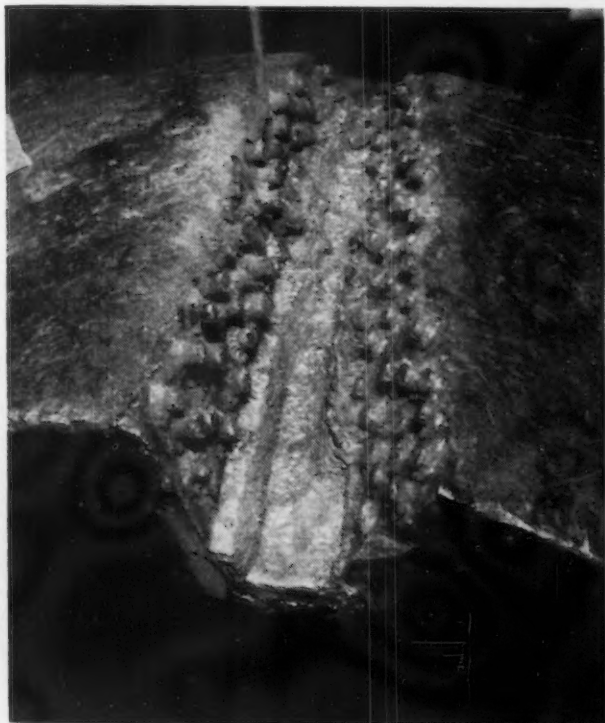
RIGHT

FIG. 3—The upper of these two illustrations shows studs improperly placed in the portion to be repaired. The studs should be placed equi-distant, about an inch apart, so that the electrode can be moved between them easily. They give added strength to the weld and less heat is required when studs are inserted. The lower illustration shows studs properly placed.



LEFT

FIG. 4—This large cast iron spider originally was cracked all the way through. In the illustration it has been partially arc welded with the aid of $\frac{5}{8}$ in. studs.



BELOW

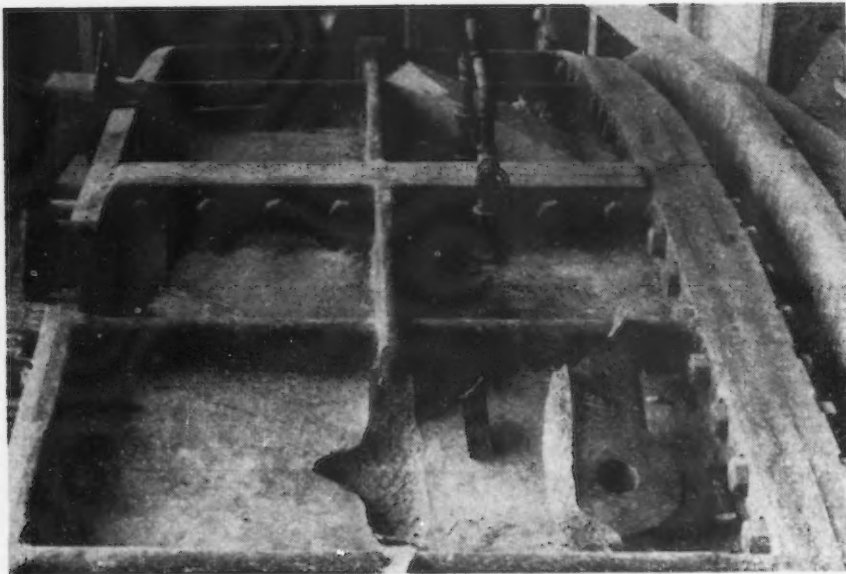
FIG. 5—Finished weld of spider.



Preheating of cast iron by using charcoal or placing the casting in a furnace without pyrometer control is poor practice. Many times where castings have been placed in charcoal, the light sections reach a white heat while the heavy sections are only a dull red. The welds turn out all right but the tensile strength is reduced in the light section to such an extent that it may later fail in tension.

Although many defects are found in the cleaning room by inspectors, still others are not found until castings have been finish machined or are subjected to hydrostatic test. If the defect can be welded without reducing its strength or any other function that may show up when in actual working operation, it is welded by electric arc or oxy-acetylene methods.

oxy-acetylene process castings are sometimes placed in an annealing furnace to preheat before welding. Other times castings are preheated by a kerosene torch and welded, placed in powdered asbestos and later placed in an annealing furnace and stress relieved to 1100 deg. F. Through numerous research tests on welding and annealing of welds on cast iron, it has been found that 1100 deg. F. does not reduce the tensile strength of the material but that over 1250 deg. does. Care should be taken to see that these furnaces are properly taken care of by experienced workmen.



ABOVE

FIG. 6—A lifting lug was broken off the large cast iron water box of a steam condenser after the assembly was placed in position. The lug is shown to the right of the depression.

o o o

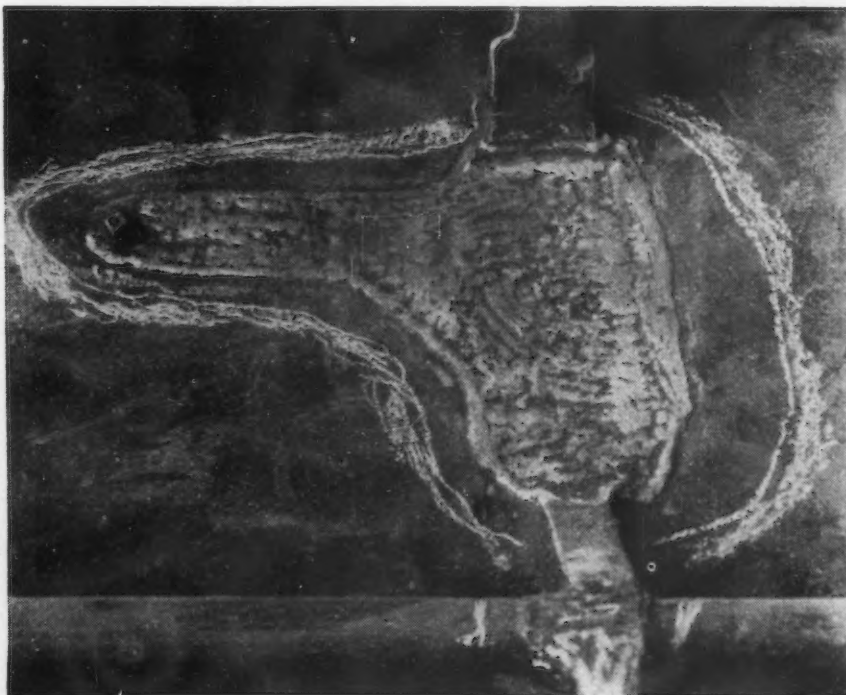
RIGHT

FIG. 7—The broken section shown in Fig. 6 was studded where possible. The center of the section was only $1/16$ to $1/8$ in. thick where the center of lug was torn out and hence could not be studded although it would have to hold a pressure of 30 lb.

o o o

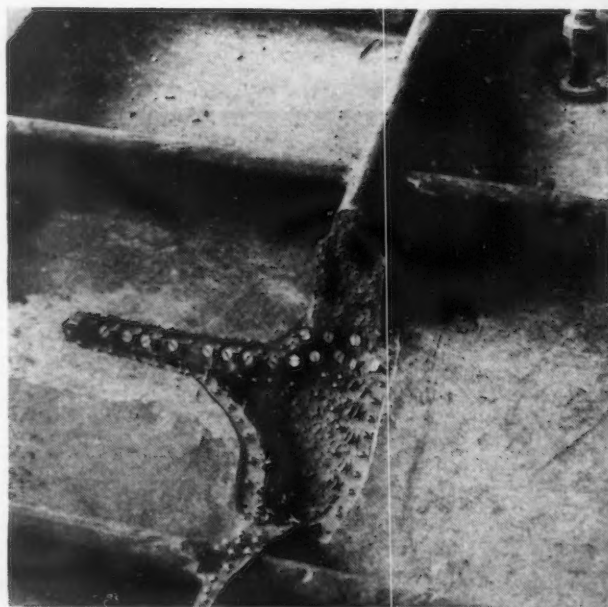
BELOW

FIG. 8—The finished weld (see also Figs. 6 and 7). Note the pipe plug placed at the end of the longitudinal crack in the casting. This prevents further cracking.



Appearance is a secondary factor. If the defect is on a flange or on the outside corner of a casting, gas welding is the usual choice and the casting is warmed up to 900 deg. F. with an oxy-acetylene torch on the section where the defect is found. If the defect is of a minor character on the inside or in a section of the casting that does not have to be machined and is repaired only for appearance sake, the electric arc is generally used. Very good results have been obtained in welding cast iron with the metallic arc, using shielded electrodes.

Within recent years a cast iron core electrode that has a dip coating has been used which gives a machinable weld and does not have as hard a fusion line as is obtained with alloy



electrodes. The part of the casting which has the defect is preheated a temperature of about 400 deg. F. and after welding the section is heated to around 900 deg. A hand pyrometer or Tempilstik is useful for controlling the temperature in this work.

In all arc welding of cast iron care must be taken to see that all dirt, scale, sand or any other foreign material that would wash into weld is removed, since the opportunity is lacking of "puddling" the metal as is possible with the gas torch, thus bringing the dirt or sand to the surface and removing it with the filler rod.

Studding Procedure

Where a large casting is subjected to hydraulic or steam pressure and where peening must be resorted to in order to make the weld water tight, anchor studs are used in conjunction with arc welding to produce a bond



ABOVE

FIG. 9—Bronze welding technique was used to repair this shrinkage cavity shown in the corner of a large casting.

strong enough to resist heavy peening blows. Several such repairs are illustrated (See Figs. 1 to 8).

The defect may be a shrink pocket, a sand inclusion or other spongy section. The foreign material is chipped out and the bottom of the cavity ground and brushed perfectly clean, after which it is peened to close any gas inclusions that may not be visible. In order to prevent undercut when the cast layer of metal is added and to aid in blending the filler metal into the machined surface, the edge section is chipped out $\frac{1}{8}$ in.

In a weld of this kind anchor studs are staggered 1 in. apart, the holes for these studs drilled and tapped so as to get five or more threads. The purpose of studding is to give greater strength to the bond so the weld can be safely peened. The first layers of metal are added from stud to stud. Great care is taken not to work too fast as the best procedure on this class of work is to keep the work clean and cold.

Monel metal electrodes are used on this work as this type of electrode has ductility at the junction of the weld and does not pick up the carbon from the iron, at least not as much as do medium carbon steel electrodes. The center of the weld is always kept

it is better because of the lower temperatures used. Several examples of bronze welding with gas are illustrated (Figs. 9 to 14). The only thing that can be said against brazing is the color contrast; for that reason brazing is seldom used on new castings. It is used for repair or maintenance work in the shop, and sometimes for repair work sent in by customer or on work done in the field. In nine out of ten cases it is the best method for making large broken cast iron repairs.

The metal spray gun has been employed for experimental work on some small castings. Some foundries may be able to use it to their best advantage on small standard castings. It has been found that the preparation of the casting governs the success or



ABOVE

FIG. 10—The finished bronze weld. No studs are used in this method, but the casting is preheated. The welding is done with oxy-acetylene.

RIGHT

FIG. 11—This large casting was badly cracked. Note the hole drilled at the base of the crack. After welding, this will be redrilled and tapped and a pipe plug inserted.

higher than the outside edges. After each layer is deposited, it is lightly peened and is brushed clean. Never let the weld get too hot. After the weld is finished, ground and polished, it is hard to find. No failures are known when this method is used.

Some foundries use brazing for the repair of castings. A good brazing job is as satisfactory as any other method of repair and in some cases



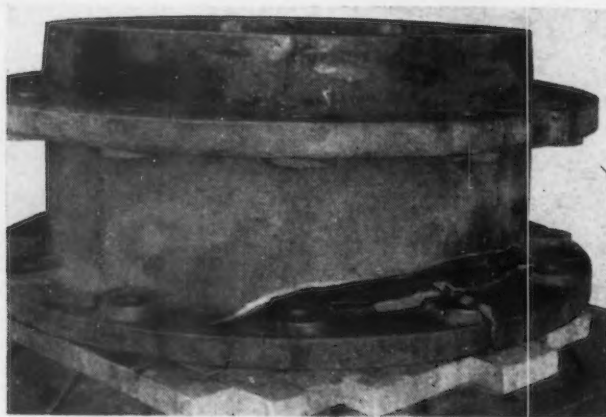


failure of this method of salvaging castings.

"Burning" Repairs

The "burning" of castings is done only on castings of a large size when a considerable amount of metal is

added to the defective area. The first operation in preparing a defect for burning is to block the casting in such a position that the defective area will lay level. A mold is then built around the defective section with loam. The mold is made so that there will be an



ABOVE

FIG. 13—This large cast iron base was badly damaged. Part of the rim (lower right) was completely separated from the body of the casting, and the large crack extended almost across the base. Note the roughness of the chipped section. This roughness helps to bind the repair material and is also desirable because it holds material better in tinning.

o o o

LEFT

FIG. 12—The defect shown in Fig. 11 was bronze welded in a vertical position, first being preheated and expanded $3/32$ in. with a pipe jack. This was done to keep the surface of the flange square so that no remachining would be necessary.

additional amount of metal from $1/2$ - $3/4$ in. higher than the original casting and the flow off will be $3/8$ in. above the casting. The casting is then preheated with charcoal, the charcoal being placed underneath the section depending on the design of the casting. If there is a light section between two heavy sections, only the heavy sections are preheated with the charcoal as the light section will be taken care of by conduction of the heat. After the casting reaches a temperature of around 1200 deg. F., the iron is poured from a ladle into the mold.

A small amount of metal is added and the workman dips his rod into the molten metal after it is poured into the mold. By agitating the metal he can readily tell whether the proper joining of metal at the bottom of the burn has been obtained by the rod traveling smoothly over the bottom surface. If the rod drags, the worker puddles some more until he is sure that there is no roughness at the bottom of the burn. He then adds more metal.

The metal should be poured from a height of about 2 ft. If it is poured from a lesser distance, it does not seem to produce the proper flowability of the iron. It should be remembered that the metal being poured out of the ladle is at a temperature of around 2750 deg. F. while the base metal is at 1200 deg. Hence, agitation of the base metal is necessary to obtain a good bond.

After the mold has been filled with iron, more charcoal is added to the preheat fire and the casting is then covered with a piece of asbestos or sheet iron and allowed to cool slowly so as to relieve strains. Full stress relieving may then follow.

FIG. 14—The casting shown in Fig. 13 after repair. Casting was preheated by the use of charcoal, then bronze welded using oxy-acetylene gas.



Unitemper Mill Stretches Steel Strip

o o o



DURING recent years, the manufacturers have required greater temper hardness of tin plate and at the same time satisfactory ductility of the metal for fabrication. The result has been that the temper pass mills have been built heavier and stronger to withstand rolling loads sometimes higher than those encountered in the cold reduction of the strip from the hot rolled gage down to the required gage before temper rolling.

Some years ago, the United Engineering & Foundry Co. started research and development on methods and means to produce this required harder plate with the thought in mind of producing a more ductile material at the same time.

Out of this development has come a new type of mill and method of processing strip. For identification, United has applied the trade name "Unitemper" to this unit.

After discussion with some of the principal steel mills, the Republic Steel Corp. agreed to install such a unit in their Niles, Ohio, tin mill.

Prior to the advent of this mill, practice was to temper roll the sheet or tin plate stock in a conventional rolling manner. The Unitemper Mill is based upon the entirely new principle of work hardening or tempering by continuously stretching. These improvements are the subject matter of a number of pending patent applications.

At first glance (see accompanying photograph) the mill appears to be a conventional 4-high mill because it has four rolls mounted vertically in the mill stand. However, it actually consists of two independent 2-high mills, one mounted above the other in the same mill housings, with a screw-down for the upper set of rolls and a

bottom screwup for the lower set of rolls.

By regulation of the differential in speed between the lower 2-high mill and the upper 2-high mill, the strip is continuously stretched between the two mills to the extent necessary to obtain the desired temper, hardness and ductility. An accompanying and very desirable result of the process is that it produces an extremely flat product because in effect it embodies all of the essentials of continuous stretcher leveling.

The strip is fed over a deflector or billy roll into the entry tension rolls, which in turn feeds the strip through suitable guides into the upper 2-high mill. The strip is then mechanically guided around the bottom roll of the upper 2-high mill and then around the top roll of the lower 2-high mill into the bite of the lower set of rolls. It is then fed through guides into the tension rolls on the delivery side of the mill and then to the tension reel

where an United belt wrapper winds the first few wraps of Unitempered strip on the reel.

The mill rolls of the Niles mill are driven by two motors of different horsepower, the smaller motor coupled to the bottom roll of the upper 2-high mill and the larger motor driving the top roll of the lower 2-high mill. A mechanical drive and single driving motor can, of course, replace the two-motor drive.

The unit was designed with a top speed of 3000 ft. per min., but at present it is being operated at a somewhat slower speed. It has been found by actual experience that the Unitemper mill will make all hardnesses up to and including T-5 temper from one grade of rimming steel and with one pass through the mill. This point alone is said to allow a considerable saving to the producer because of standardization of ingot analysis and cost of temper rolling and makes this new process very attractive to the producer.

Effect of Grain Shape on Synthetic Sand

THE influence of grain shape on the behavior of sands in synthetic molding sand mixtures bonded with clays, core oils and core compounds has been investigated and reported in a paper by W. Davies and W. J. Rees to the Steel Castings Research Committee of the British Iron and Steel Institute.

In order to examine the relation between grain shape and grain size, sands which had accumulated under different conditions as outlined below were divided into fractions according to grain size by sieving, and the coefficients of angularity of these frac-

tions were determined. It was found that the coefficient of angularity varied with the grain size and that the general nature of this variation depended on the original source of the sand, conditions of accumulation and degree of consolidation.

Sand	Derivation
A	Water borne
B	Water borne
C	Accumulated under desert conditions
D	Carried by glaciers for considerable distances
F and G	Derived from Triassic sandstones by glacial action. Glaciation effective for a short period.

(CONCLUDED ON PAGE 108)

... Learning Arc Welding Design

THE full employment of arc welding as a means of producing metal machinery and equipment is fundamentally predicated on a mode of thinking—the assumptions in the mind of the designer that “It can be made by arc welding.”

This mode of thinking is one which can best be acquired by experience and growth in the use of the method, the training of the eye and the imagination to see and visualize arc welded structures with their welded edge-to-side or edge-to-edge construction rather than other forms such as the curved, rounded and tapered construction of cast members, or the lapping, reinforced, rivet-studded joints of a riveted unit.

The development of this mode of thinking is fundamentally much more like the design and steps of workmanship involved in cabinet making or carpentry than casting or molding because it consists of building up a unit of its component functional parts and structural framework, including housings, points of bearing, load carrying members and conveyors of motion, all proportioned and distributed according to the needs of the unit.

The fact that the component parts, such as shown in the gear cases in Fig. 1, may be made by cutting and shaping sections of standard shapes, plates, bars, or strips of steel (or other weldable materials) is a distinctly different line of thought and professional development than the conceiving of a machine and designing it as a casting to be poured; and somewhat different from a riveted structure with its lapped joints and reinforced, riveted joints.

One important resource which steel fabricating organizations have for the training of welding designers, where they may acquire the mode of thinking required for effective arc welding design, is the use of welding as completely as possible for the industrial construction and maintenance problems which arise within the organization.

The problems of welding design which may arise in a maintenance or industrial construction department of a factory are practically unlimited. They may range from the production

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of the steel storage rack shown in Fig. 2 where the whole problem is simple, involving almost no question of strength of materials, but rather one of form, convenience in the use of space and expediency.

From simple applications of this kind there is almost an unlimited variety of shop fixtures and equipment such as steel storage racks, handling equipment, wheeled buggies, monorails, tote bins, welding fixtures, pipelines, blowers, ventilating equipment, motor bases, machine bases, washing machines, and even including complex processing machinery to meet special requirements where existing purchasable machinery would not entirely satisfactorily do the job and where outside engineering agencies would have to do a special designing job prior to producing units that

would then fit the application.

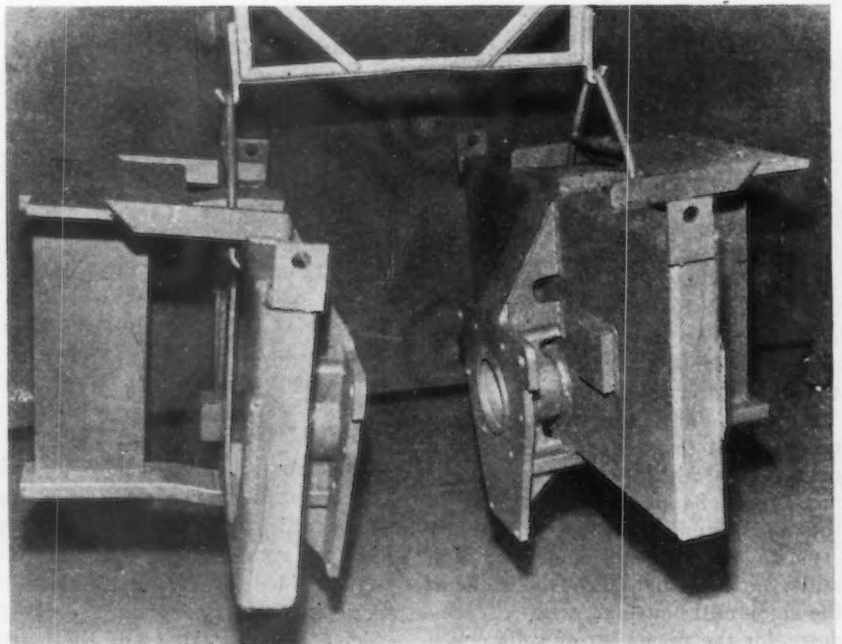
The wide variety and frequency of these problems allows the training of welding designers by actual practice. The range of problems from simple to complex provides practice for the learning designers in almost any stage of proficiency. Some of the problems available in such a training program are shown by examples of increasing complexity cited below.

Simple Welded Structures

Among the most simple pieces of equipment used in a plant are those which have in themselves no motion, but which serve for their structural purposes only, examples of which are the rack shown in Fig. 2 or the material handling tote bins and skids such as shown in Fig. 3. About the only real requirements for these pieces of equipment are that they be strong enough to carry the loads which they will have to carry, that they fit the spaces required for their use, and that their parts be substantially joined together so that they will not fail during service.

The design of a steel rack such as

FIG. 1—Welded design is a mode of thinking based on combining pieces of metal cut from standard plates, shapes, and bars by welding them into such structures as these gear cases.



By Welding Shop Equipment . . .

shown in Fig. 2 simply requires the determination of the space which it must occupy, the size and weight of the material which will be placed in it or would be convenient to place in it, the amount of strength required to carry the load, together with a decision as to the form of joints and a planning of the means of loading or unloading the rack.

Beyond these simple considerations, there is not much required in appearance, special form or highly specialized function in such a designing problem. It therefore provides a means for a beginner to solve some of the fundamental problems in welding design without jeopardizing customer good will or product quality. It confronts the beginner with specific problems of forms of material available, strengths of various combinations of available materials, forms of joints to be made with available materials, the details of a variety of possible combinations of available materials and joint construction with their varying degrees of convenience or production and varying strengths, costs and appearances.

... By starting out with the design of simple welded structures for shop use and advancing to the more complex, the beginning designer can gradually accumulate enough experience to apply arc welding to the plant product on a mass production basis. He thereby acquires a sense of proportion and knowledge of fabrication methods necessary to the successful application of the arc welding technique.

It also gives him an opportunity to observe the form of the structure to be built with the relationship of volume of material to working space, together with the possibility of constructing the rack so he gets the maximum storage space with the minimum of material and the best arrangement of the material to minimize lost space by joint construction.

These are all fundamental considerations in arc welding, and to allow the beginner to study such problems and exercise his imagination and designing skill on shop equipment provides an expedient and effective means of giving him that experience, as well as using the product of his efforts as a beginner.

A common item of equipment in a welding shop that involves some de-

gree of motion and involves certain points of reference which must be accurate, and therefore presents a somewhat more complex designing problem than the simple storage rack, may be illustrated by the welding setup and positioning fixture shown in Fig. 4.

The structural members for spacing and holding the parts to be setup and welded in this fixture must have sufficient strength to hold the parts and must be accurately spaced to insure the correct form of the structures which are patterned within the framework of the jig. An additional step in complexity of design is involved in the axle which allows the fixture to be rotated in a single plane and therefore presents the problem of designing simple bearings to accommodate relatively slow motion.

This additional stage of complexity confronts the learning designer with the problem of the fastening of a shaft of such construction that it can be a journal bearing or axle onto the fixture itself, and provide it with a bearing surface upon which it may turn and rest in the supporting legs of the jig. Means of lubrication of the bearing surfaces must also be provided, for greater ease of turning.

This presents the learning designer with the question of amount of strength and bearing surface required for given loads and may provide a good study for simple bearings, bearing lubrication and bearing materials.

An additional problem which this particular jig poses is that of distribution of material so that the fixture is balanced and may be spun around the axis provided without requiring excessive effort to turn the fixture. This requires an analysis of total weight, weight distribution, the derivation of the center of mass, and the calculation of the place where the axles should be placed to most

FIG. 2—This welded steel storage rack represents a problem simple enough for the beginning designer. It has no moving parts, but presents problems in strength of materials, joint design, overall capacity and a means for loading and unloading the rack.





FIG. 3—These shop transportation skids and bins represent another simple example of design problems encountered in making shop equipment. Use of available materials, rugged construction and design for economy of space and materials are problems encountered in their construction.

nearly balance the fixture for welding.

If the learning designer misses the location of the central axis in this particular fixture, it is not difficult to attach counterweights so that the fixture may be made to work properly and still not add much to the engineering expense.

Since it is constructed by arc welding, the fixture may be cut apart, remodeled, added to or revised, according to the desires of the designer. This is another decided advantage of welded construction which the learning designer should recognize in his acquisition of the mode of thinking as long as it does not make him careless and slipshod in his work.

The three-wheeled buggy shown in Fig. 5 represents a slightly different problem, since it involves the requirements of mobility for shop transportation. In this case, the learning designer encounters the problems of wheels which must pass over shop floors and perhaps shop yards, axles and bearings which must stand up under somewhat more severe motion and varying loads than the one in the fixture shown in Fig. 4, together with a means of achieving stability so that the buggy can turn corners without turning over. The wheel bearings require more positive lubrication and oil seals because of heavier loads and greater speeds encountered.

Here again a wide variety of designs is available and although the problem may be simple to an experienced arc welding designer, it can

form the source of valuable experience for the beginner.

Designing a Processing Unit

The design of a relatively simple unit such as the parts washing machine shown in Fig. 6, represents a designing operation of greater complexity than those previously described because it involves the combination of several relatively simple units into an assembly.

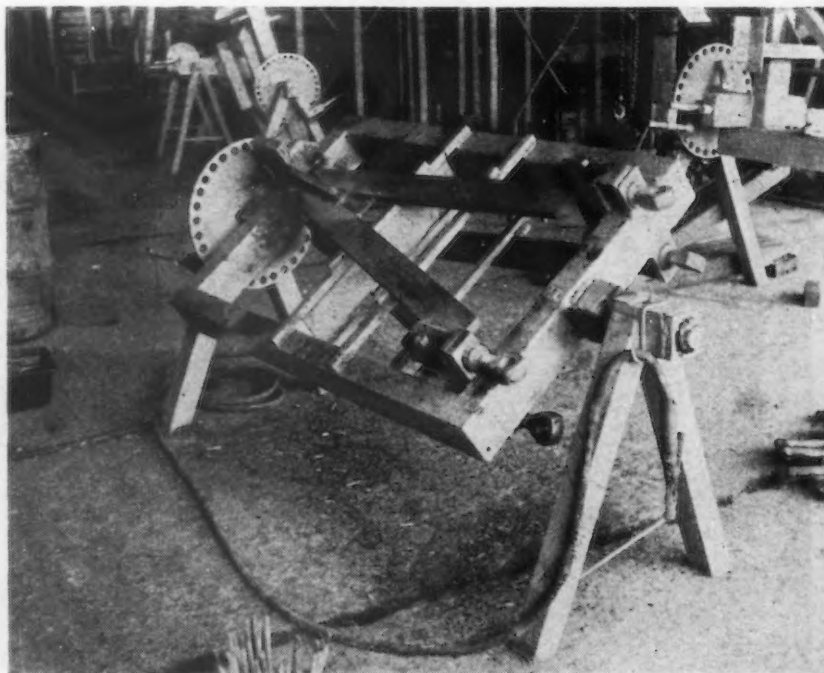
Each component part of this washing machine is relatively simple. It presents the designer with the problem of an enclosed box with plumbing through which water may be pumped under pressure and sprayed onto the parts in baskets, a heating unit in the bottom which will keep the water hot, a pump, watertight doors, a rail or some other mechanism to guide the parts container through the unit, and a parts container or rack.

The use of welding in the manufacture of tank-like structures or boxes which are watertight is only a matter of imagination for the designer and correlation of the needs which the unit must serve with the available material with which to do the job.

The planning of how to attach a pump and motor to the main frame of the machine and protect it from the drainings from the parts which come out of the washing machine must be solved. The problem of introducing the wiring, piping and plumbing required for the driving of electric motor and pump, the drainage and introduction of water into the unit, the internal plumbing, and the heating system, all present the designer with an opportunity to do considerable studying and exercise ingenuity and imagination.

Since the requirements for such a cleaning unit vary considerably with different applications within a plant, it is often advantageous to make a special unit to do each special job rather than to try to compromise on a generalized machine which may be pur-

FIG. 4—Fixtures like this welding setup and positioning jig are required for welding production. To the young designer, they present problems of balance, axles and bearings for light service, and structural strength.



chased. By building it within the plant, using available materials, machinery and manpower, experience in welding design may be obtained by the engineering department. When it is finished, the unit will probably have all of the necessary functional qualities, although perhaps not all of the refinement that a highly specialized, purchased (and therefore customer styled) unit would have.

The combination of such a washing machine into a specialized processing system as shown in Fig. 7 provides further experience for the designer since it involves the combination of several simple assemblies. This system is essentially the spray type washing machine shown in Fig. 6 followed by a spray rinsing machine which is the same as the washer, a tank in which a rust inhibiting material is applied to the parts by dipping, followed by a wind tunnel through which the parts travel, cool and dry.

The parts are taken through this system in baskets suspended on an endless monorail. After they emerge from the wind tunnel the baskets are unloaded and are then washed free of excess preservation prior to being loaded with parts again.

The dipping tank and the washing tank for the baskets are simply tank-like containers with the appropriate type of lid and of the appropriate size to accommodate the baskets.

The wind tunnel involves the mounting of a purchased blower and provides some experience for the designer in mechanisms involving the flow of air since it is desirable in this case for the air to enter at the bottom

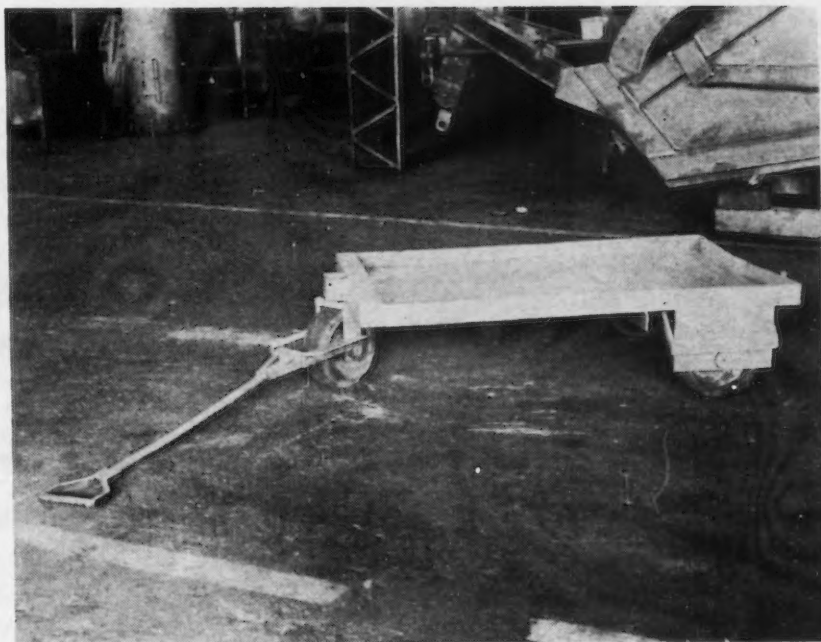


FIG. 5—This shop transportation buggy presents additional design problems of mobility, together with the need for rugged, light and simple construction.

of one end of the wind tunnel, to proceed across and through the parts in the baskets to the entrance end and be exhausted.

The provision of a means of suspending baskets from the monorail and taking them through the washing machines and drying ovens without interference and without the splashing out of the contents of the washing or rinsing machine involve further problems for consideration which develop the ingenuity and imagination of the designer.

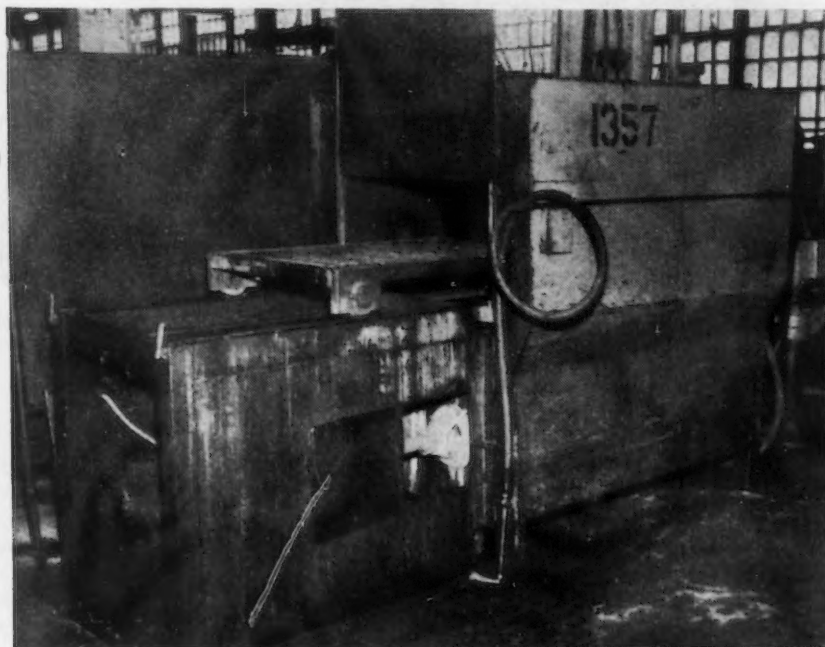
This example of a type of process-

ing system is only one of a group, which might be encountered by many manufacturing organizations wherein a series of simple tanks, containers, vats, plumbing, conveyors, etc., might be organized for cleaning, quenching, processing or painting operations. This type of installation often represents a special engineering job by someone. If done by designers within the organization it represents not only training opportunity, but in addition it has the advantages of expediency, economy of materials, economy of time and often economy of overall costs. This economy of costs is accomplished because of no special charge for engineering, sales expense or profit by the manufacturer or special, and in many cases unnecessary, styling.

Maintenance Welding Design

One of the problems which is frequently encountered by the maintenance department of a manufacturing organization is the repair of broken equipment or worn out equipment of some design other than arc welding. Such repairs frequently present the designer with a rare opportunity for comparing the contrasting welded construction with another type of construction. An example of such a repair is the ram and crown structures for the 250 ton mechanical press shown in Fig. 8. This machine was originally of cast iron construction, and the ram and crown structures failed in service as shown in Fig. 9. The problem of a permanent repair resolved itself into either the purchase of a new ram and crown casting or the fabrication of one by welding.

FIG. 6—This parts washing machine brings the design of water tanks, plumbing, a heating unit and several other problems to the learning designer.



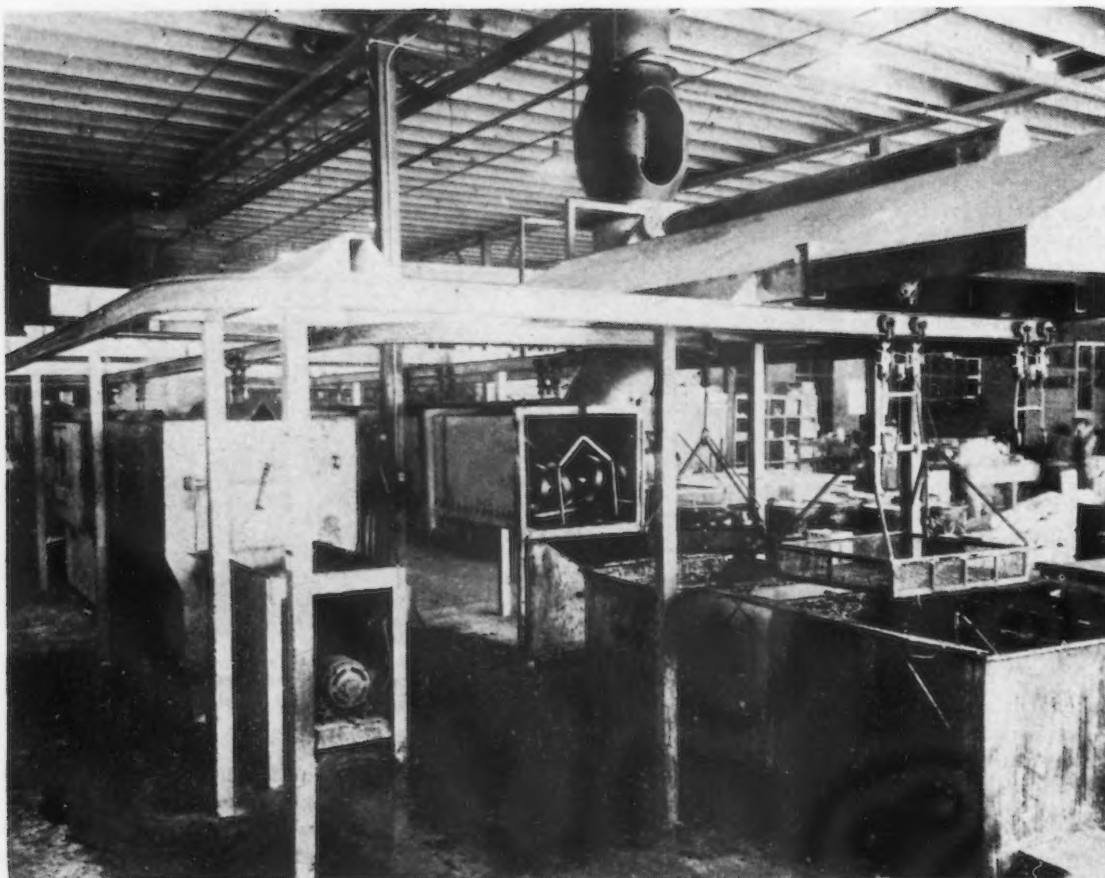


FIG. 7—The combination of several relatively simple welded tanks, washing units and a wind tunnel to make a unit such as this parts processing system constitutes a designing job where expediency, use of available materials, labor and design talent often result in a satisfactory and inexpensive installation.

In this type of repair, the designer uses steel sections which he builds up piece by piece into a structure. The fabricated structure must operate in conjunction with the rest of the machine which is made of a different type of material (cast iron) and must correlate sliding surfaces, mechanical tolerances, stresses, mechanical strength and overall clearances together with a difference in elasticity and stress strain characteristics.

The marked contrast in the appearance of the types of construction is readily made apparent to the designer in such a repair. It is this kind of repair which if skillfully done to accomplish economy of material, proper distribution of functional parts of the unit, overall strength and satisfactory mechanical operation demonstrates the economy in materials and workmanship which may be realized in the original production of machinery by welding.

The maintaining of an accurate account of the cost of designing, fabricating and machining of such structures as the crown and ram shown in Fig. 8 makes it possible to compare the original cost of the replacement part with that of the welded structure. If a realistic attitude is taken in the analysis of the probable original

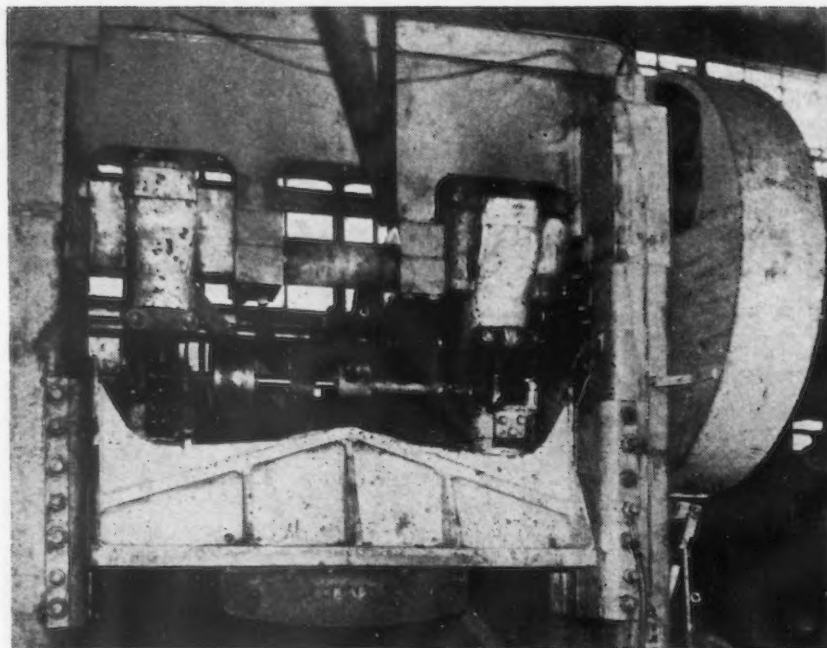


FIG. 8—To fabricate new parts such as the crown and ram for this 250 ton mechanical press when the original cast members failed provided both a highly effective repair at a reasonable cost and a design exercise in contrast in types of construction.

cost of the production of the original machine compared to its selling price, a reasonably good estimate of the economy of the welded construction for original production of the machine may be arrived at.

An example of a high type of development of welded design which,

when achieved, may be comparable to the designing required for the major product of an organization, is illustrated by the semi-automatic machine tool for mass production of machine parts shown in Fig. 10. This machine represents more complex problems for the welding designer

than any of the previous ones discussed in that it includes a synchronized series of movements and operations controlled centrally. It involved gearing, a power drive, a timing system, a hydraulic system, compressed air cylinders, lubricating system, a series of parts holding devices, a group of cutting tool holders and a separate coolant pumping, piping and delivery system, all correlated for semi-automatic operation.

The stepwise method of thinking, the construction of the machine in functional parts rather than as a complete casting, the concept of clearances, appearance, structural shape, and material strength definitely constitute the mode of thinking of arc welding design in this particular case.

The rugged structural strength of such a unit, the elasticity with which it may be made to conform to space and strength requirements and the freedom which may be employed in designing to produce the unit, such as premachining of parts, bending, shaping and forming, attaching of acces-

sion, outfitting the plant or tooling up a plant are specialized and pertain only to that particular plant that to use existing equipment which may be purchased often represents a compromise and a sacrifice of most efficient function. The problem of design for many simple machines, fixtures or equipment for the factory are sufficiently within the training and ability of learning designers that they may be made within the organization with a degree of mechanical perfection which satisfactorily meets the needs.

The fact that the materials used for such equipment or fixtures may often be taken from the available material and often from the scraps left over from the regular products of the plant presents a real margin for economy in the cost of the material for such equipment.

The machinery for cutting, shaping, forming and welding and machining is usually available in a factory even if it does little welding beyond plant maintenance. The fact that the work-

man and machinery are available also includes an asset of considerable importance, namely that of the mechanical ingenuity of the designers within the organization and the mechanics who fabricate and assemble or install the equipment.

The need for such equipment is often urgent, and the length of time which would be required if the unit was ordered from an outside source which would have to come and design the unit, go back home and engineer, order materials, produce in a correlated schedule with many other orders and deliver it often takes longer than is desirable. Since the people in the plant already know the problem, they usually can design the unit, make it and install it much more quickly than an outside firm.

Still a further economic advantage which may pay for some of the errors which will likely be made by the beginning designer as a part of his experience is the economy arising from the elimination of special tailoring as customer service which a manufacturing and selling organization almost has to do, and the profits which must of necessity be associated with any purchase.

The actual evaluation of the experience provided to learning engineers in this mode of teaching the various aspects of arc welding design is difficult, but it provides a means for giving experience in varying degrees of complexity to the designing staff.

Considerable experimentation in types of joints, thickness of materials, distribution of materials, form of design and other aspects of product en-



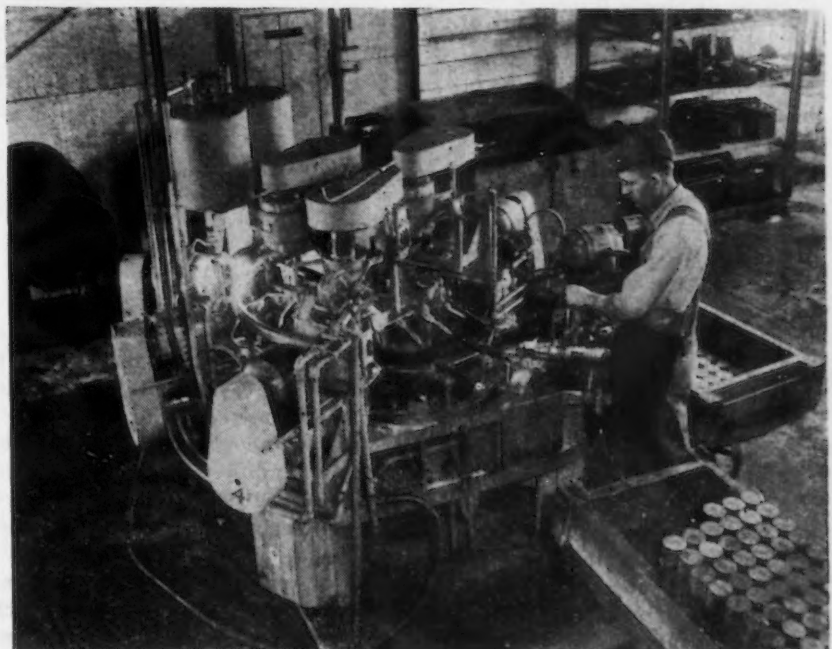
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FIG. 9—The original, broken crown of the press shown in Fig. 8. The replacement crown made by welding had to be made to fit the dimensions and points of function of the rest of the cast press frame.

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FIG. 10 — A special machine to solve a mass production problem, this semi-automatic pin drilling unit represented a task in design which might challenge the ability and capacity of an experienced welding designer.



sories or auxiliary parts by simply welding them to the main structure, are all distinct characteristics of this type of construction which a designer must learn by practice.

So many problems in industrial con-



FIG. 11—Experience in welding design gained by making shop equipment is reflected in the details of the design of such major products as this heavy earthmoving unit. Good welding design can be achieved only by practice; designing shop equipment provides both variety and practice.

gineering may be experimentally tried without interfering with the function of shop equipment, and still provide a very effective means of testing the various elements of design under consideration.

Design of Major Products

The experience gained by the designer of shop fixtures and equipment is incorporated and reflected in the production of major products which are designed and produced by arc welding.

Certain different elements enter into the design for mass production of a

welded product which do not enter into the ordinary shop fixture or processing machine built for use within the plant. One of the biggest differences is the number of units which will be built. Ordinarily shop equipment or specialized machines for the shop are built individually or in relatively small numbers, while such arc welded machines as the tractor and earthmoving unit shown in Fig. 11, are made on a mass production basis. The problem of refining the design so that the parts of the unit may be manufactured efficiently therefore is of considerable importance.

This requires the designer to consider carefully the operations of forming, shaping, forging, economical cutting and economical joint designing to utilize materials and the welding process at its highest efficiency.

Production items may also involve some special refinement in appearance or in generalized functions which are designed to cultivate the preference of the customer, or to accommodate special applications of the machine in its operation in the field. The final development which results from practice in designing arc welded equipment from simple to complex is the achievement of the point of view that the appearance and style of the finished product is the best if it does the job for which it is designed better than any other available product.

This outlook automatically minimizes the handicaps which preconceived ideas of the shape or style of a unit places upon the designer. It is only by experience and practice that the most effective arc welding designing and the highest development of finished product may be achieved. This can only be achieved by experience in designing and this experience may be accelerated considerably by a practice of designing and manufacturing shop equipment within the organization.

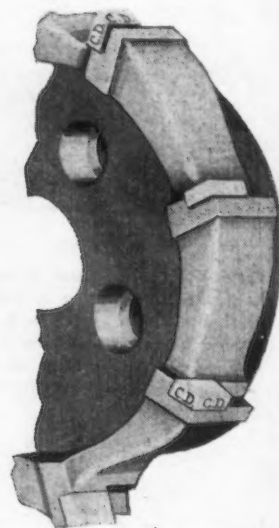
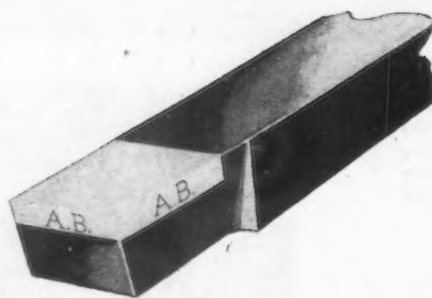
Tool Control by Etched Identification

AN answer to precision parts manufacturers' needs for a method of identifying and controlling precision ground cutting tools has been found in a simple etched identification system. The problem has been that of unauthorized or poorly informed operators endeavoring to dress or grind tools between regular tool room grinds with the result that many tools and in some instances many precision parts have been damaged.

The control feature of the etched identification system is that the identifying symbol is etched into the surface of the tool's relief where it receives no wear and consequently remains until ground away in the following tool dressing. (See the two accompanying illustrations.) This has the dual purpose of identifying the responsible grinder so long as it is there and proving tampering the minute it is removed.

Application of the etched symbol has been so simplified that it should prove to be of minimum trouble in any tool room. The operator merely places a paper stencil carrying the desired symbol in contact with the relief sur-

face of the tool and applies the etching current with a Lectroetch hand pad. The symbol is electrolytically etched into the surface instantly to a depth of about 0.0001 in. which serves as a semi-permanent marking yet has no effect on the tool's physical characteristics. Since the paper stencils are inexpensive and easily prepared, numerous types of markings are no handicap and use of the etching system can be expanded to general



identification systems for tool sizes and grades with a high degree of permanence. The small electrical equipment required is likewise inexpensive and fully portable.

Marking is possible with equal facility on any type of tool material from carbides down the softest grades by the Lectroetch (electrolytic) process.

American-British-Canadian Screw Thread Standards Near

UNDER the necessities of war production, the United States, Great Britain and Canada are slowly but surely approaching the point where interchangeable screw thread standards between the three countries will be a reality. This was brought out at a meeting held in New York, Nov. 16, at which a progress report was presented by the United States-Canadian Screw Thread Mission which had been sent to London last summer by the Combined Production and Resources Board, Washington. The meeting was sponsored by the American Standards Association, the Society of Automotive Engineers and the American Society of Mechanical Engineers.

Different standards in the United States and Britain has already added at least \$100,000,000 to the cost of the war and has caused incalculable production and repair delays, according to William L. Batt, U. S. deputy member of the Combined Production and Resources Board, who addressed the opening session. Adoption of common standards would aid war production, Mr. Batt said, and would give impetus to postwar trade in industrial equipment. "While the matter of screw threads may seem like a rather simple thing to the average man, the fact is that our whole machine-age economy is actually held together by screw threads," Mr. Batt reminded his audience.

He reported that spokesman for the Army, Navy, the Aeronautical Board of the Army and Navy, the U. S. Maritime Commission, as well as the State and Commerce Departments, were unanimous in their opinion that the unification of screw thread standards should be vigorously pursued. It is expected, he said, that industry will immediately grasp the significance of a common standard and the utter necessity for it not only in helping to win the war, but also in the expanding world trade in prospect after the war. While he devoutly hoped that there would not be another war, the speaker said we cannot afford to get into one without screw thread standards between the United States and Britain. Reporting on present diffi-

culties, he quoted ordnance engineers to the effect that it requires three times as long to get British type tools and gages as it does to get American, and that the price has run three times as high.

In conclusion, Mr. Batt stated that he had found the British intelligently cooperative and thought that a reconciliation of differences could be achieved before the end of this war.

Two conferences have taken place between engineers of the United States, Canada and Great Britain, one in the latter part of 1943 in New York, the other last August and September in London. Elmer J. Bryant, chairman of the U. S.-Canadian Screw Thread Mission and chief research engineer, gage division, Greenfield Tap & Die Corp., gave a general report on the conferences and at a latter session individual members of the mission presented progress reports on individual projects. The members of the mission are pictured. Copies of the full report are available from the Superintendent of Documents, Government Printing Office, Washington, or from the ASA, the SAE and the ASME.

The conference held in New York in 1943 had for its primary purpose the resolution of problems relating to the production in the United States of the Whitworth form of threads on munitions of British design. The main difficulty experienced in America in the production of the Whitworth form of thread concerns the rounded crests and roots. Out of these discussions came plans for the second conference in London, the results of which are reviewed below. It is not surprising, therefore, that the subject of truncated Whitworth threads was first on the agenda.

Truncated Whitworth Threads: The American delegation presented a draft specification on truncated Whitworth threads. This specification provided information as to the form of thread and tolerances for the threads in the B.S.W., B.S.F., B.S.P. (Parallel) series. The British delegation was generally in agreement with this specification, except as regards the form at the roots of the threads

which, in their opinion, should be rounded in order to withstand fatigue, instead of being flat as stated in the American proposal. (ASA War Standard B1.6-1944.)

The American delegation agreed to this amendment, and also to a further recommendation that the same designation should be given to truncated Whitworth threads in both countries. The gaging practice laid down in the American specification was based on the gage tolerances of the inspection gages being located within the tolerance zone of the product. This was at variance with the British practice in which the tolerances on inspection gages are placed outside the tolerance on the work to insure that no work made within the tolerances should be rejected. While no immediate solution was found to the problem, it was appreciated that truncated Whitworth threads made in America and accepted by American inspection gages would be interchangeable with threads made in Great Britain. On this basis it was agreed that the American gaging practice as set out in their proposed specification might stand.

It was further agreed that the Screw Thread Committee of the BSI should, as soon as possible, publish an amendment to British Standard 84 on Whitworth screw threads, with a view to providing British industry with adequate information regarding the truncated form of the Whitworth thread.

Cylindrical Fits

The conference considered a Proposed American War Standard for Cylindrical Fits in which a series of preferred basic diameters, tolerances and allowances were set out as well as a system of symbols for designating shafts, holes and fits. The British delegates approved the scheme of preferred diameters, tolerances and allowances, but thought the American proposal was open to the objection that it provided no guidance to the designer in the unlimited choice of combinations of tolerances and allowances on shafts and holes. Having in mind that the current British Standard for limits and fits was more com-

prehensive in form though complicated, the British delegates proposed a remodeling of this system, using the American system of preferred diameters, tolerances and allowances associated with charts of simple form for various classes of fits. The American delegates viewed this suggestion favorably. Since the suggested system is applicable to a wider sphere than cylindrical bodies, it was agreed that its title should be changed to "Limits and Fits in Engineering."

An interchange of information took place on the systems of limit gaging in vogue in America and Great Britain. It was agreed that this matter should be reconsidered by the respective Standards Associations, with the view to removing the present difference in the practice regarding the location of the inspection gage tolerances in relation to the tolerance zone on the product.

High Duty Studs: The American delegation stated that no definite standard had been adopted in American industry for tolerances on the threads at the fitting ends of high duty studs and for the corresponding tapped holes in light alloys. Selective assembly is being used and the amount of interference varies from 0.003 to 0.006 in. depending upon the size of stud and hardness of the light alloy—the lower the hardness, the greater the interference. There is also a tendency for American manufacturers to use stepped studs with a size larger thread at the fitting end, with the view to obtaining a better distribution of stress in the light alloy.

The British presentation indicated a general usage of the practice set out in British Standard 1171:1944, in which the truncated Whitworth form of thread is used and the maximum size for the stud is made basic size. The desired amount of interference, which is of the order of 0.002 to 0.003 in., is obtained by using under-size tapped holes. It was agreed that the United States should prepare a War Standard for stud fits, having in mind the British Standard referred to. Canada would then issue a corresponding Standard.

Pipe Threads: The American delegation presented a proposed revision of the American Pipe Thread Specification ASA B2.1. on which the British delegation offered a number of comments. In view of the extensive use of British Standard Pipe Threads on the Continent and in other countries, it was suggested that the United States and Canada should consider the publishing of an Emergency

Standard for British Pipe Threads up to 4 in. based on the present British Standard No. 21.

On sizes above 4 in., in view of the considerable production in the United Kingdom of American Petroleum Institute line pipe threads on oil country goods, it was agreed that the British would consider the publication of a standard for these larger sizes based on the American Specification.

An interchange of information also took place regarding threads for electrical conduit and it was agreed that further data should be interchanged with a view to unification of these threads.

Screw Threads for Compressed Gas Cylinder Outlets: Difficulty has been experienced in the use of American-made cylinders containing compressed gases such as acetylene, oxygen, nitrous oxide, etc., with British equipment due to the different types and sizes of threads adopted in the two countries for the outlets on the valves of these cylinders. This difficulty is being overcome by the provision of adaptors for connecting the cylinders of one country to the equipment of the other. Since the New York Conference in 1943, data has been collected by the British on the sizes of outlet threads of cylinders made in the two countries for various gases used by the fighting services. It was agreed that this information should be published in the form of a joint specification showing for each gas the recommended design of adaptor to connect American cylinders to British apparatus and vice versa. A system of making these adaptors was also agreed upon.

Acme Threads: The first British Standard for general purpose Acme threads was published in 1943 and followed in close detail the American Standard published in 1941. At the London conference, the American delegation presented its new prepared War Standard for Acme threads which establishes a recommended series of threads of related diameters and pitches and provides information on limits and tolerances for three grades of accuracy not only for the screws and nuts in the recommended series, but also for those of non-standard diameters and pitches. A recommended system of gaging is also covered.

The British delegation approved this standard with a few minor amendments, and agreed to publish it as a BSI standard. At the same time, the British recommended that the ASA prepare a corresponding American Standard for stub-Acme threads

for ultimate acceptance also as a British Standard. This suggestion was agreed to.

Buttress Threads: It had been agreed at the New York conference that the United States and Great Britain should collect data on the types of buttress threads used in those countries, with the view to establishing a common standard. At the London conference, in the American proposal, the form had a 7 deg. angle for the pressure flank, a 45 deg. angle for the back flank, flat crests on the screw and nut, having widths of one-eighth and one-quarter of the pitch respectively and suitably radiused roots. The form of thread proposed by the British delegates, based on a mathematical investigation of the resistance of the thread to combined bending and shear, had flank angles of 7½ and 45 deg., flat crests of equal width on the screw and nut, and cleared, radiused roots with a depth of engagement equal to two-fifths of the pitch.

It was finally agreed that the accepted form should be in accordance with the British proposal, but with a 7 deg. angle for the pressure flank. The BSI is to formulate a draft standard on the agreed lines and to include recommendations for the relationship of pitch to diameter, clearances and tolerances, and gaging practice.

Instrument Threads: For fastening screws above 0.06 in. diam., it is American practice to use the American National Fine series, and British practice to use the BA series, principally the even numbers. It was realized that it would not be possible to achieve a unification of these larger screws.

For screws below 0.06 in. diam., an American proposal for a series ranging from 0.01 in. x 400 th. to 0.06 in. x 80 th. was discussed in relation to the BA series and the Swiss horological series of threads in metric units having a 60 deg. angle. It was finally agreed that, for instrument screws smaller than 0.06 in., the BSI should prepare, and submit to America, a modified BA series with the diameters and pitches in inch units rounded off to convenient figures, in the hope that agreement might be reached.

As regards fine motion and translating screws for instruments, the American delegation had no proposals to offer and they were informed that certain recommendations were to be found in a Report on Optical Screw Threads issued in 1920 by an advisory committee of the Department of Scientific and Industrial Research. A subcommittee of the conference later

set out a tentative short series of pitches and preferred diameters from $\frac{1}{8}$ to 1 in.

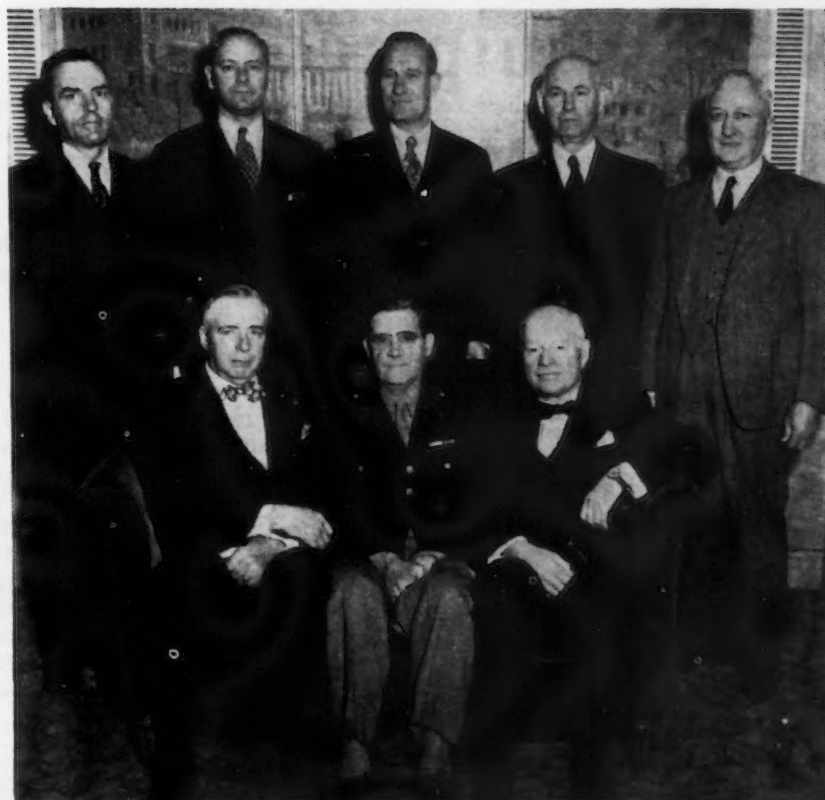
In the case of optical mounting threads it appeared that, for objectives, the British Royal Microscopical Society thread was universally used in America and Great Britain. On the other hand, the British delegation reported that the series of threads on tubes recommended in the D.S.I.R. Report (1920) was not generally worked to in Great Britain. A subcommittee drafted a new series of pitches for optical mounting threads on a preferred number basis.

Unification of Screw Threads: In a historical review of the subject, Cyril Ainsworth, American Standards Association, mentioned that the last attempt at unification in 1926 originated with the British, who offered a compromise thread with an angle of $57\frac{1}{2}$ deg. and so proportioned as to permit of reasonable interchangeability with existing Whitworth and American threads. This proposal was not accepted by the United States. The subject was revived by the British mission at the Screw Thread Conference in New York in 1943, where it was pointed out that, above $\frac{1}{2}$ in. diam., the B.S.F. series of threads was little used, whereas in the United States the American National Fine series of threads was widely adopted. He felt, therefore, that acceptance of this series by the British might possibly form a basis for the unification proposed.

J. G. Morrow, chairman, Canadian Standards Association, stated that Canada was particularly interested in unification, since through two wars she had had to produce ordnance and equipment to different thread standards. His country was solidly behind the present proposal for unification.

In presenting the British viewpoint, F. H. Rolt, chairman, BSI Screw Thread Committee, stated that, since the return of the British Screw Thread Mission to the United States in 1943, the BSI Screw Thread Committee had given active consideration to the possibility of unifying the American and British systems of screw threads. Early in 1944, they had held a conference of industrial engineers and the general opinion was that any such unification should be in the direction of a flat-crested thread with a rounded root.

His committee also offered for consideration three tentative series of threads, whose diameters and related pitches were based on a logical sequence of preferred numbers. The



MEMBERS of the U. S.-Canadian Screw Thread Mission sent to London last August. Seated, from l. to r.: Elmer J. Bryant, chairman of the mission and chief research engineer, Greenfield Tap & Die Corp.; Col. H. B. Hambleton, Ordnance Department, ASF.; and James G. Morrow, vice-chairman of the mission, chairman, Canadian Standards Assoc., and metallurgical engineer, Steel Co. of Canada, Ltd. Standing, l. to r.: Frank E. Richardson, senior engineer, Army Air Forces; Paul J. DesJardins, chief engineer, small tools dept., Pratt & Whitney Div., Niles-Bement-Pond Co.; Cyril Ainsworth, assistant secretary, American Standards Assoc.; H. W. Bearce, chief, division of weights and measures, National Bureau of Standards, and Neil Petersen, president and general manager, Canadian Acme Screw & Gear Co., Ltd.

coarse thread series was closely in agreement with the B.S.W. and the American Coarse Thread series: The fine thread series followed closely the American Fine Thread series and the extra fine series was proposed as a standard for design thread.

The American delegation presented a proposal for unification based on the American Fine Thread series, the form of thread being the same as the U. S. Standard except that the root was rounded. In discussing this proposal, the British delegates confirmed the desirability for a change in the present B.S.F. series in the direction of finer pitches on the lines of the American National Fine Thread series. They held the view, however, that the case for a change to the 60 deg. angle would require to be supported by convincing proof of the superiority of the proposed form of thread over existing standards. It was for that reason that they proposed a joint research program on the strengths of threads of varying angles and proportions. This being agreed to, a subcommittee subsequently formulated a detailed program for

the research to be carried out in the three countries. It was also agreed that when the ideal thread form had been established, consideration should be given to the simplification of the existing thread series as recommended in the second part of the British proposals.

Design and Drafting Practice: The British delegates acquainted the visitors from overseas with recent developments in Great Britain in the establishment of a code of practice in dimensioning and tolerancing drawings, coupled with a simplified method of presenting essential information on drawings by the use of symbols for indicating position, concentricity and symmetry tolerances. It was agreed that the universal adoption of this practice would result in a considerable saving of time and avoidance of ambiguity in drawings.

Tool and Screw Thread Production: A conference also took place with representatives of the British tap and die manufacturers at their request, since the coordination of thread specifications demands a similar coordination of practice in production tools.

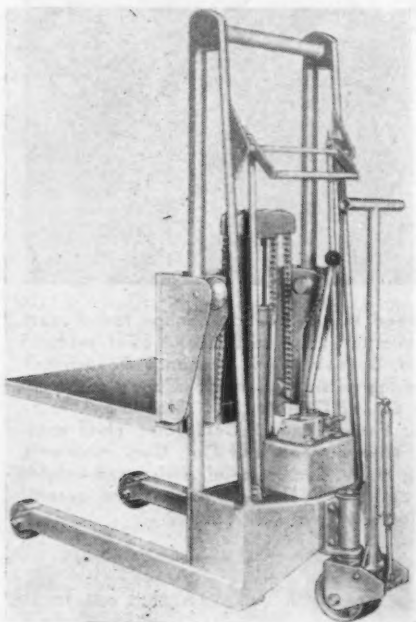
New Equipment . . .

Material Handling

. . . Recent developments in lift trucks, cranes and other material handling equipment are described in the following pages.

Lift and Tying Truck

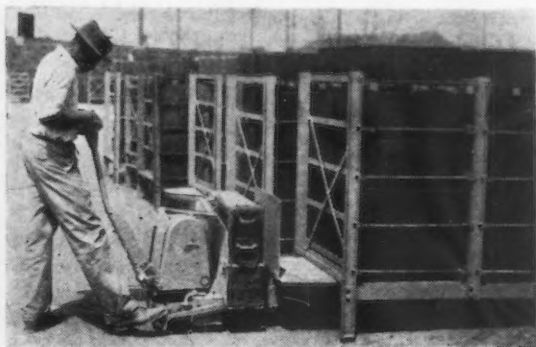
A COMBINED lift and tying truck has been developed by *Lyon-Raymond Corp.*, 1599 Madison Street, Greene, N. Y. The truck weighs only



495 lb. and turns within its own length. The truck is Timken equipped and has a powerful floor lock. The standard model has a capacity of 1000 lb., a platform 24 x 30 in. and a raising range of 42 in. (6 in. lowered to 48 in. elevated).

Foot Operated Lift Truck

A FOOT operated hydraulic lift truck, the "Transporter," with electric power front wheel drive, has been announced by *Automatic Trans-*



portation Co., 101 West 87 Street, Chicago. The truck is made in both platform and fork type pallet models. Standard established platform lengths for the 4000 and 6000 lb. capacity platform are 36 to 72 in. Standard widths are 20 in. and 26½ in. with heights 6, 7, 9 and 11 in. The lift from low to high position is 3½ in. Standard established pallet fork lengths for pallet model are 30 in. to 60 in. in 2 in. steps. Standard width is 27 in., and fork height in low position is 3¾ in. with 3¾ in. lift.



Bridge Ramps for Car Loading

BRIDGE ramps for car loading have been announced by *Elizabeth Iron Works*, Elizabeth, N. J. Curvature at the top of the ramp platform permits variance in degrees of height between the loading platform and the car. The lift handles stay up when in use and slide down flush with the riding surface when not in use. Shock plates absorb impact and transmit it to stringer plates. The ends of the stringers are set back and rounded off to permit the truck to turn sharp corners. A locking device on the sides attached to the stringers is operated by a heavy tempered steel pin adjusted to set in place to fit the openings.

Self Dumping Hopper

A SELF dumping hopper which is an all-metal skid bin with a hinged bottom has been developed by *Yale & Towne Mfg. Co.*, Philadelphia 24. The dumper can be picked up and moved by hand lift truck but for the dumping operation the hopper must be employed in conjunction with an electric fork truck. Dumping is done by elevating the hopper with the truck forks until the bin handle engages with a positive action catch at the top of the truck elevating column. The forks are then lowered leaving the hopper suspended. Anti-friction rollers on the back of the bin permit the forks to slide down easily. The unsupported hinged bottom opens, allowing the contents to pour forth. The empty hopper is easily released from the catch on the elevating column by raising the forks. The feed hopper is then lowered on the forks and carried away for refilling.



NEW EQUIPMENT

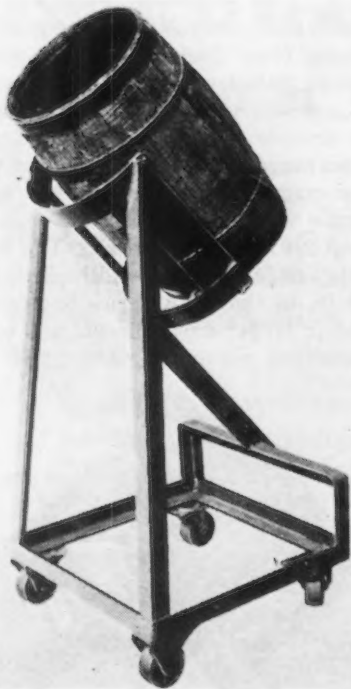


Gas Powered Lift Truck

A GAS powered lift truck with pneumatic tires, the Hyster 20 lift truck, has been announced by the Hyster Co., Portland 8, Oregon. The truck which has a traveling speed of 12 mile per hr. will carry a load up to 2000 lb. Trunion steering permits the truck to turn in its own length.

Stock Positioner

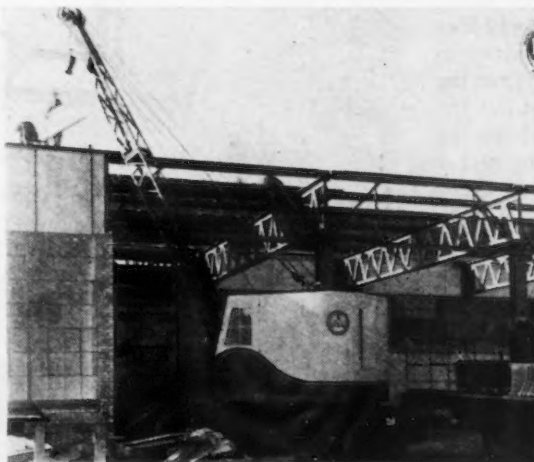
A STOCK positioner for assembly operations has been developed by Palmer-Shile Co., 784 South Harrington Avenue, Detroit 17. The positioner holds materials or small parts (in containers) within easy reach of the operator ready for quick assembly



or other hand production operation. The device is portable and may be spotted at machine or bench wherever necessary. It is adapted to hold any kind of container for positioning powders and liquids, nails and fasteners, metal or other production parts. The instrument is built in order to meet the user's requirements.

Mobile Crane

A MOBILE crane, the Unit 1020, which is $\frac{3}{4}$ yd. machine mounted on a three axle undercarriage, providing a complete unit which is one-man operated, has been announced by Universal Unit Machinery Corp., Milwaukee 1. From his position in the cab the operator controls not only the functions of crane operation but the traveling of the undercarriage. Travel brakes are operated by means of air while the steering is hy-



draulically operated. A four speed transmission gives a range of speeds from slightly less than 1 mile up to 8 mile per hr.

Overhead Crane Limit Stop

FOR use on overhead traveling cranes to prevent overtravel of the hoist motion, the Electric Controller & Mfg. Co., Cleveland, has developed the Youngstown safety limit stop. Known as the No. 20, the stop is of the main circuit type handling motor current directly within itself. It not only disconnects the motor from the line on d.c. cranes but brings the hook to rest quickly by dynamic braking. It may also be used on a.c. cranes to disconnect hoisting power from the motor. Features of the machine include Oilite bear-

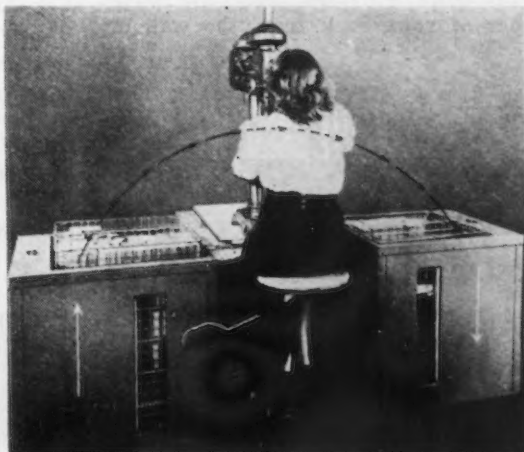
ings which are self-lubricating, two normally open and two normally closed contacts mechanically interlocked and with wide vertical opening to assure safe interruption of the hoist motor current under any hoisting conditions, flexible power leads, synthetic rubber bushings, and mica insulations.

Floor Operated Crane Controllers

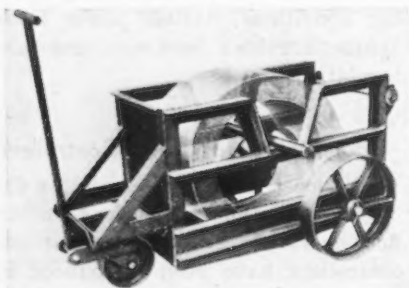
TO meet the requirements for any combination of motions on d.c. floor-operated cranes, standardized controllers have been announced by the Electric Controller & Mfg. Co., Cleveland. A pendant type station contains push buttons for all motions. A double pole toggle type switch for opening both sides of the control circuit serving the panels on the crane is used for emergency stop as well as for disconnect purposes. Hoist panels are of the dynamic lowering type for cranes without mechanical load brakes, and of the reversing type for cranes having mechanical load brakes. Trolley and bridge panels are of the reversing-plugging type. The main hoist has overload relays and low voltage protection.

Tote Box

FOR progressive assembly the Lowerator automatic Tote-Box-Rak has been announced by Lowerator Mfg. Co., 110 Pearl Street, Brooklyn 1. Parts are placed in individual baskets and deposited one upon the other in the Tote-Box-Rak near the operator. After machining, the operator places each piece in the top basket of the Tote-Box-Rak to the right. As one side gradually and



automatically moves up, the other side can move down but the top of both baskets remain always at the same level regardless of how many baskets may be in either rack.



Coil Steel Truck

DESIGNED for handling heavy coil steel, a truck has been added to its line of material handling equipment by *Palmer Shile Co.*, 784 South Harrington Street, Detroit 17. The truck is equipped with three heavy duty, roller bearing metal wheels. The safety bar at the rear is chained to one side of the truck. By removing this bar the coil can be rolled out the rear or it can be picked up by an overhead hoist by means of the center bar. The truck is built only on order to take care of coils of the size and weight called for. The one illustrated is of 1 ton capacity. These trucks can also be used to handle coils of wire or other products of similar size and shape.

Skid Platform

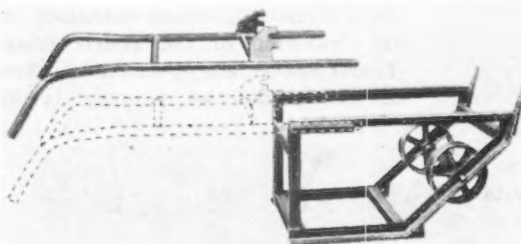
TO handle breakable materials and metal parts having machined or polished surfaces that cannot be stacked directly on top of one another without danger of damage, a skid platform with interlocking channels and a vertical end frame has been announced by *Union Metal Mfg. Co.*, Canton, Ohio. The platform can be tiered as high as the lifting mechanism of the fork or platform lift truck will take them. The number of rows back from the wall or



from the structural assembly depends entirely upon the available storage area.

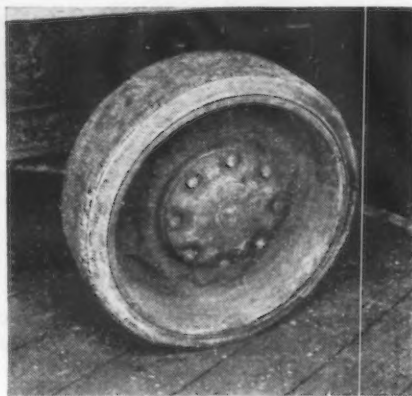
Truck and Drain Rack

A TRUCK and drain rack with detachable handles has been announced by *Palmer-Shile Co.*, 784 South Harrington Avenue, Detroit 17. When the truck is in use as a drain rack for drums, the handles are pulled out. The truck and drain rack may be had complete with handles or without handles. Detachable handles are also supplied separately. The truck and drain racks are of the automatic loading type.



Wood Wheels

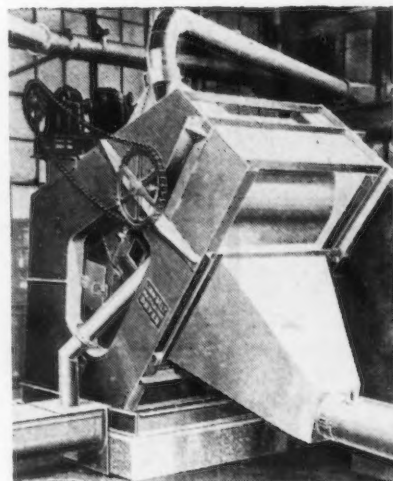
DESIGNED to meet an emergency need for wheels where standard rubber wheels are not available, *Elwell Parker Electric Co.*, Cleveland, has developed a wood



wheel to be used with power industrial trucks. Though test data shows a decrease in efficiency and increase in power consumption and shorter life as compared to rubber wheels, it has been demonstrated that the wood wheel can be used should rubber become seriously curtailed.

Louvre Type Dryer

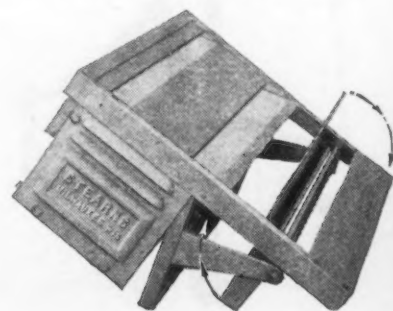
DESIGNED for low cost drying or cooling of bulk materials which do not require long retention periods, a louvre type dryer has been announced by the dryer division of *Link-*



Belt Co., 300 West Pershing Road, Chicago. Called the multi-louvre dryer, the fully enclosed unit contains moving louvres supported on power operated endless chains. These louvres present the material as it flows to secure thorough mixing action and contacting of the material with the heated air. At a controlled temperature, air is drawn through the moving mass of material and exhausted at top of the dryer.

Spout Type Magnet

DESIGNED to eliminate iron for the protection of crushers, grinders and other machinery, a spout type magnet known as the Stearns "Super Class AAA," has been announced by *Stearns Magnetic Mfg. Co.*, Milwaukee 4. Features of the equipment include an armature which insures automatic opening and closing of the tramp from discharge gate, a simple design gate lever arm, a clean tramp iron discharge gate, tramp iron wells to provide high intensity and double pass magnetic action and louvre type non-magnetic side plates to allow ample ventilation to cool the coils but keep out injurious particles. The magnets are furnished in widths from 8 to 20 in. in the AAA series but can be had in larger sizes for coal and other industries requiring giant types.



**Easy to operate . . . extreme accuracy
high spindle speeds . . .**

HARDINGE
ELMIRA, N. Y.



HARDINGE Second Operation Machines mean better results without expensive tooling

For precision second operation work, the trend is to Hardinge. The initial low cost, the versatility and unusual capacity, without the set-up complications involved with large machines, created an ever-increasing demand for these machines.

The double tool cross slide and turret take standard tooling. The six-position tilted turret has an automatic indexing and locking head with six independent travel stops.

The illustration shows one of the groups of Hardinge Second Operation Machines in the production of precision aircraft parts at Moore & Steele, Owego, N. Y.

Specifications: 1" collet capacity, 6" step chuck capacity, 5" jaw chuck capacity, 9" swing, eight spindle speeds up to 4000 r.p.m.

HARDINGE BROTHERS, INC.
ELMIRA, N. Y.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

Assembly Line

STANLEY H. BRAMS

• **Bigger business seen in equipment field for contractors and other excavators . . . Enlarged work on railways, airports, dams, highways is anticipated.**



DETROIT—Dishing up the dirt is more than a function of the newspaper columnists. In the form of earth-moving and excavating it was a big industry before the war; it has moved apace during the war, in the construction of camps, roads, air-dromes and other installations; and it promises to be a really strapping activity when peace comes.

This outlook is of definite interest to the steel industry. Earth-moving equipment, like shovels, cranes, drag-lines, off-the-road vehicles, scrapers, etc., are built big and tough. They require good quantities of bars, billets, heavy gage sheets, structural shapes and pipe.

Goodyear Tire & Rubber Co., interested in putting these contractor vehicles on tires instead of tracks, has been conducting an intensive research into the outlook for moving earth—possibly the first broad study which has been made of this taken-for-granted activity. The findings are being shown around the country to selected audiences. Although the presentation is intended entirely for the nation's 3000 contractors, 800 industrial machinery distributors and 200-odd industrial machinery manufacturers, it has some observations of general interest which cannot be omitted by capital goods suppliers looking ahead to the postwar years.

Contractors for railroads, logging camps, airports, mines, highways, and dams will be the largest postwar users of earth-moving machinery. In each case, the Goodyear survey points out,

anticipations are considerably expanded over prewar levels. One conclusion may be questionable but it is certainly chock-full of interest: graphs point out that times of prosperity and depression have correlated quite notably in the past with periods in which construction ballooned and dwindled.

It is to be admitted that the railroads are preparing great plans to hold their war-expanded traffic against the onrushing competition of the airlines. Their need will be speed, and to obtain it they will be going to great lengths to straighten out straying roadbeds which could not begin to handle the 100-mile-an-hour passenger train schedules being projected for the future. Earth-moving, obviously, becomes most important here. There is talk of a 20-year program of new terminals, faster equipment, straighter right-of-ways, milder grades, and double and quadruple trackage.

In the mining field, it is pointed out that 489 stripping operations five years ago have now increased to 840. During 1942 a total of 63,000,000 tons of coal was taken up in surface excavations; and last year some 83,000,000 tons of iron-ore were so removed. The growing tendencies in this direction will rebound to the benefit of the excavating machinery makers. Other off-the-highway vehicles will be more widely utilized in logging, where more

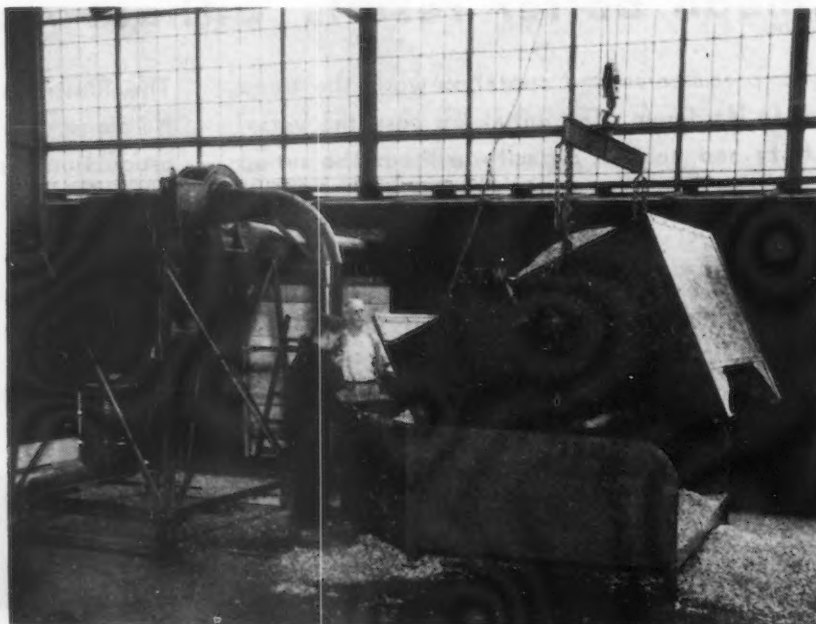
roads are being built and planned from forest to mill to port.

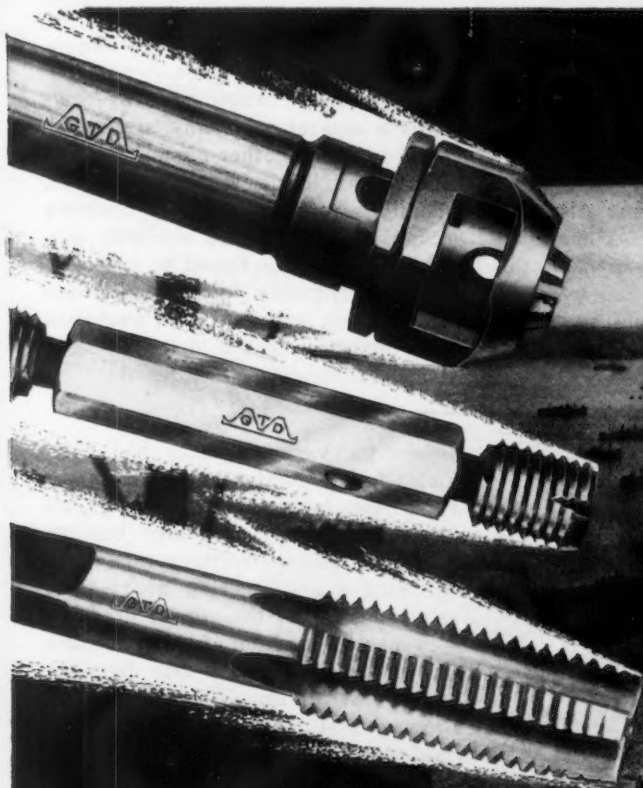
Before Pearl Harbor there were 76 airports in the country which had at least three runways of 3000-ft. length or longer. By September of 1943 that total had increased to 865, and in all there were 3072 landing fields. By the end of next year plans call for their increase to about 4000; and by 1951 a projection to 6000 all-purpose fields is said to be in the cards.

Economic planners figure that a budget of about \$1,000,000,000 yearly for airports and dams is justified. Certainly dam building for navigation, irrigation, flood control and power projects, both public and private, seem bound to continue in at least the prewar rate, probably higher.

Highways, naturally, will absorb a lion's share of postwar earth-moving expenditures. Postwar urgent needs amounting to \$16,500,000,000 have been outlined, of which state highways will require \$7,500,000,000; country and local roads, \$4,000,000,000; and city streets \$5,000,000,000. Only by thinking in terms of expenditures of that size, it is stated, can road administrations hope to handle the 38,000,000 cars and trucks expected to be on the highways five or six years after the war ends. In addition to roads within the United States, large increases are anticipated abroad. Postwar planning for China is said to

SUCTION LOADING OF SCRAP: *Aluminum scrap produced in a Chevrolet plant producing Pratt & Whitney aircraft engine parts is brought on craneway to the docks, where it is dumped into a hopper from which it is sucked up and blown into box cars. Previously the chips were bailed for shipment; the new method facilitates handling and shipping.*





Official U. S. Navy Photo

A SCREW THREAD "TASK FORCE" THAT HELPS YOU WIN *PRODUCTION BATTLES!*

We hear a lot about *teamwork* in this war . . . amphibious and triphibious operations . . . the coordination of land and air and sea forces.

There are similar "task forces" of men and machines and tools in industry, too. Threading metal parts, for example, must be done at high speeds and at accuracies measured in ten-thousandths of an inch or even finer. This has meant the development of a "team" of high speed precision taps and dies to cut the threads . . . plus gages to check the accuracy.

"Greenfield" has devoted itself to the perfecting of this screw thread "task force". It has a country-wide staff of field engineers . . . its "intelligence" . . . continually bringing in reports of operations. It has its "headquarters staff" of trained screw thread and gage engineers to turn these field reports into blue-prints and plans . . . and it has a highly skilled "army" of men and women with the equipment to turn blue-prints into tools . . . the "Greenfield" Taps, Dies, and Gages that together form screw thread "task forces" in the plants of America's metal-working industry.



Better Threading with Better Tools

GREENFIELD TAP & DIE CORPORATION
GREENFIELD, MASSACHUSETTS, U. S. A.

be in terms of an ultimate million mile roadway network. Argentina has 17,500 miles of highway mapped out; Brazil has 25,000; and India has set up a 20-year postwar program including 400,000 miles.

To handle a volume of work expected to be considerably greater than ever before, makers of heavy excavating equipment are planning more unit production than in the past, and in many cases on larger-sized products. Where a mule and scraper could move a cubic yard of dirt, prewar mechanized applications made possible the removal of 12 to 20 yards at a time. And, now, to typify development, Euclid has a 270 hp. Diesel dump unit which takes 30 yd. of dirt in stride, and handles 40 yd. with a wagon hitched behind.

A look at the size of this market may be of interest. Basic information on it is obtainable only in the Manufacturing Census of 1939 of the Department of Commerce. This shows such unit and dollar totals as follows:

	Number	Value
Power shovels	2250	\$24,849,590
Attachments		5,490,034
Crawler cranes	313	4,105,325
Draglines	355	6,154,333
Trench excavators	225*	1,907,972
Attachments		1,338,176
Scrapers, Wheel	2900	6,698,715
Scrapers, Drag	650*	860,536
Scrapers, Horse Drawn	15,905*	539,180
Scraper attachmts.		259,859
Bulldozers, etc.	5047	4,242,238
Graders	3155*	7,160,736
Spreaders	990*	1,226,746
Road rollers, self-propelled ..	899	2,836,820

*Incomplete unit figure

Tractors weighing 14,000 to 30,000 lb. will not be unusual in the postwar period, reports from the excavating machinery builders indicate. That means dollar averages will rise, and so will weights and applications of steel. Obviously this is big business. It is impossible to make a really dependable estimate of average quantities of material going into such a great diversity of equipment, but it is certainly plenty. If the anticipations for postwar growth expressed on every hand by analysis-minded manufacturers of such equipment come true, even in modified amount, the added tonnage involved will be a welcome addition to steel company order books.

Last week was enlivened by the filing of a suit against Bendix Aviation Corp. by Bendix Home Appliances, Inc., seeking to enjoin the former company from entering the home radio business. The position of the appliance concern, once an affiliate of Bendix Aviation, was that Bendix Home Appliances is entitled to exclusive use of the name in the home appliance field. So, if the appliance con-

cern wins its case, Bendix Aviation plans to invade the home radio field, and perhaps others, would be negated.

But Bendix Aviation maintained that its advertising shirttails have provided a free ride for its namesake company, and that objection to this has been entered several times—inferring that the appliance suit was merely a quick move to gain the advantages of the plaintiff in a court action.

General Motors Sends Millionth War Built Machine Gun to Army

Detroit

• • • Specific example of General Motors application of its know-how in production of war materials is illustrated with the announcement recently by C. E. Wilson, president, of the manufacture of the 1,000,000th machine gun for the War Department.

The 1,000,000th gun was produced four years after the initial order was received by the corporation and in that time cost of the machine guns has been drastically reduced. That of the .50 caliber M-2 aircraft basic has been cut 75 per cent; the .50 caliber M-2 heavy barrel flexible, 76 per cent, and the .30 caliber M-1919 A-4, 84 per cent. These types account for 94 per cent of total General Motors machine gun production.

First order was placed in a period when General Motors was still manufacturing its peacetime products and

Bendix Home Appliance was originally a separate company, started up in 1936 under another name, its product an automatic washing machine. Shortly afterwards patents covering certain phases of the washer's machinery were transferred to the company by Hydraulic Brake Co., a Bendix Aviation subsidiary, in exchange for a minority stock holding in Bendix Home Appliances.

before its various plants had been tooled for production of war materiel. From manufacture of spark plugs, oil filters, fuel pumps, car lamps, bumper guards, household refrigerators, electric ranges and steering gears—just to name a few of the prewar products—to mass production of machine guns is a long step. But the four divisions of General Motors—AC Spark Plug, Brown-Lipe-Chapin, Frigidaire and Saginaw Steering Gear—that received assignment of the machine gun contract, with the guidance of engineers and technicians, jumped the hurdle in less time than had been thought possible.

An engineering study on the manufacture of Browning machine guns was started by General Motors in cooperation with the War Department more than a year before outbreak of war between Great Britain and Germany. An "education" order was placed with General Motors for 500 Browning machine guns in May, 1940, one of the first war orders to be placed within the automotive industry.

Aid to Small Truck Trailer Makers Seen In New Quota Plans

Detroit

• • • Indication of a possible policy change within the WPB as regards allocations for limited production of civilian goods was seen in the wake of reports dealing with a recent meeting of the Truck Trailer Manufacturers Industry Advisory Committee.

Previously these manufacturers were allotted production quotas on the basis of their historical averages during the base years 1939-1941. This system is now being discontinued, however, word from the meeting stated, in favor of basic allocations of specified quotas for each producer, supplemented by the historical percentage of industry volume. This new plan, it was said, will aid smaller

manufacturers by correcting discrepancies in their allocations where their historical percentages were extremely low, with resultant authorizations limited to a few dealers. Indicative of tightness of supply in the field, officials of the Office of Defense Transportation advised the committee that approximately 18,000 trailers had been released for commercial use on rationing certificates, compared to production of 15,500 trailers, during the first nine months of 1944.

The truck trailer industry is on record in favor of elimination of ODT rationing of their products, on the grounds that truck rationing, which limits the trailer sales, is sufficient control. However, WPB has taken the position that this recommendation cannot be considered at this time because of the critical supply of tires and other components needed for trailer production.

*Greater
Inspection
Economies*
ARE YOURS



A section of the Lincoln Park thread grinding department, showing a portion of the modern equipment which is in constant use.



THROUGH THE USE OF **CARBOLOY** *Thread* **GAGES**

LINCOLN PARK was the first company to successfully produce Carboloy thread gages. It is the result of the pioneering work done and the wide experience gained over many years in manufacturing gages of this wear-resistant material that Lincoln Park thread plug gages are today providing exceptional inspection service. Records show that on many jobs more than 1,000,000 threaded holes have been inspected with one of these gages.

Lincoln Park Carboloy thread plug gages are supplied in a standard size range from a No. 4 machine screw size to 3" diameter to meet almost any specifications for tolerance, lead or pitch.

It will pay you to learn fully how Lincoln Park Carboloy thread plug gages can be used profitably and efficiently in your inspection operations.

Prompt Delivery

OF CARBOLOY THREAD PLUG GAGES

Our weekly "Current Delivery Schedule" will keep you informed on deliveries of Lincoln Park products. Write us and we will see that a copy is mailed you regularly.



LINCOLN PARK INDUSTRIES, INC.

Successor to The Lincoln Park Tool and Gage Company and Carbur, Inc.

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• Donald Nelson's cabinet post will cover all United Nations' reconstruction . . . President emphasizes manpower problem, created by workers leaving jobs.



WASHINGTON—The announcement by the White House on Nov. 21 that Donald M. Nelson has been given a position of cabinet level as personal representative to the President (*THE IRON AGE*, Nov. 2, page 106) in dealing with foreign governments may precede the creation of a federal commerce agency similar to the British Board of Trade, some government officials believe.

Mr. Nelson is to have an office near the White House and while he is in China aides are working upon plans for reconstruction and industrialization plans for United Nations. One of Mr. Nelson's closest advisers has been at the Harvard School of Business Administration for several months participating in a foreign trade study.

* * *

The President also said that workers who quit critical war jobs were costing American lives on the battlefronts because it has been necessary to ration heavy artillery ammunition. At the same time, War Manpower Commissioner Paul V. McNutt said that a manpower situation of the utmost seriousness confronts the country.

Mr. McNutt said that the situation was not so much of a shortage in the total of workers as of the difficulty of recruiting workers in some areas for "super-critical" war programs, such as ammunition.

Mr. Roosevelt said that workers who were leaving jobs in search of postwar security should be reassured

that everyone in industry and government is working awfully hard to provide jobs not only for people fighting on the fronts, but for the people who have been turning out munitions over here.

President Charles E. Wilson of General Electric Corp. was praised by Mr. Roosevelt as typical of industrialists who did not intend to cut pay after the war. Mr. Roosevelt referred to an article by Mr. Wilson. Mr. Wilson is known to favor maintaining 1942 price levels during the reconversion period.

When the President was asked about fears that heavy unemployment would come about during the reconversion period, he replied that he felt about reconversion a little like he had proved to him about conversion. The President said that the opinion on conversion of automobile plants was that it would take six months and result in loss of wages for workers, but it had turned out that when the conversion job was completed it had taken less than half the estimated time.

* * *

While there is very little difference between WPB's ideas about manpower needs and WMC's in total figures, that a need exists for pushing about 100,000 workers into critical programs and requirements for about

another 100,000 in other war industries, a WPB report shows a shortage of 252,000 workers in must programs alone.

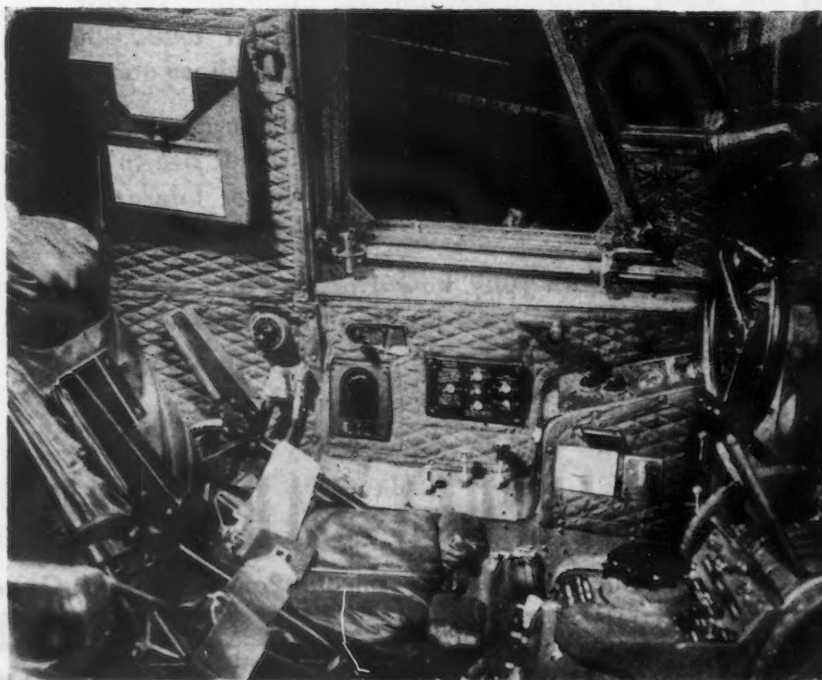
This latter report is supported by the War Department manpower representatives and WPB officials say that it is all right except that it probably represents replacements and future demands because of needs for expanded uses of facilities not yet constructed.

Bureau of Labor Statistics, on the other hand, does not seem to agree that workers in critical jobs are indulging in job-hopping more than workers in other manufacturing industries. BLS officials recently told *THE IRON AGE* that the quit rate in both divisions of industry is just about equal. BLS and WMC in their joint report of Nov. 11 indicate that there are currently 800,000 unemployed and that labor evaporation among female workers which has been a matter of great concern has been more than made up by new female entrants to the labor force.

* * *

H. G. Batcheller has recently reported to WPB on the reasons for lags in various production lines. The report which is fully illustrated with charts shows that 22 per cent of all production bottlenecks are because of manpower reasons, that 40 per cent

PROTECTIVE LINING: The captain's side of the pilots' compartment of a Curtiss C-46 Commando transport built by Curtiss-Wright Corp., shows the inch-thick Fiberglas insulation with diamond quilted trim cloth. A definite improvement in weight saving (some 200 lb. per installation lighter than kapok), it is also a protection against cold, heat and noise.



POINTS GOOD FOR 150 More Pieces!

SUNICUT

Doubles Drill Life... Improves Finish... Increases Speeds

Round, perfect holes — 300 of them per drill grind — that's the present production rate on a certain drilling operation at this large plant. But the rate wasn't always that high... as the following facts of the case show.

Poor finish and short drill life had been common complaints of the operators. On the SAE 4140 steel being machined, 150 pieces were the maximum they could get per drill grind... the finish was rough, despite the use of a well-known high grade cutting oil. Finally, they made a change in cutting oil at the suggestion of a Sun Oil Engineer. They switched to clear, transparent, sulphurized SUNICUT.

100% improvement in drill life and much better finish were immediate results of the change. They are now able to drill 300 pieces before drills need regrinding. As an extra bonus they find SUNICUT permits increased spindle speeds... further stepping up their output.

Savings in time and money are direct result of the increased production and longer drill life made possible by SUNICUT in this plant. Similar savings are possible on many other metal-cutting operations in your plant. Why not consult with a Sun Oil Engineer today on selecting the right cutting oil for these operations. Call or write

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Sponsors of the Sunoco News Voice of the Air — Lowell Thomas

**SAVE and
SERVE**

WRITE FOR FOLDER ON
SUN'S PLAN TO SAVE
EQUIPMENT-TIME-LABOR
WITH
PROPER LUBRICATION

SUN INDUSTRIAL PRODUCTS

HELPING INDUSTRY HELP AMERICA

of munitions deficits are because of stepped up programs, that 26 per cent of all troubles come from design changes and that facilities are holding up 12 per cent of all programs.

Thus with 78 per cent of all war production difficulties beyond the control of industry, labor, or the procurement agencies, without a doubt heavier pressure will be put on manpower recruitment.

* * *

The Smaller War Plants Corp. has a new Reconversion Division and is planning to give small business all the help possible in getting surplus property as it is needed. SWPC has made a machine tool survey recently, and uncovered about \$2,000,000 to \$3,000,000 worth of cutting tools in Detroit, which have been declared surplus by the Army. Interested companies should contact RFC.

* * *

The problem of getting manpower into the foundries and stimulating production has been turned over to the Steel Division by WPB Chairman J. A. Krug. This promotional work was previously done by Deputy Vice-Chairman for Production William B. Murphy, Campbell Soup executive. Mr. Murphy resigned several weeks ago and Edward Sweeney, who assisted him with the casting problems, has been detailed to the Steel Division.

Controlled Materials Data Must Apply to Actual Manufacturer

Washington

• • • The WPB has announced that in all cases where an applicant is required to accompany his CMP-4B application for controlled materials and an authorized production schedule with labor information (Form WPB-3820 revised) the information must be applicable to the actual manufacturer of the product.

This action was taken, WPB said, to clarify the requirements of labor information in cases where CMP-4B applications are filed by persons who make allotments of controlled materials to persons who will manufacture Class B products for them. These cases, it was pointed out, are exceptions to the general rule that allotments of controlled materials for the manufacture of Class B products must be obtained from WPB industry divisions.

The two exceptions are:

Where the customer has obtained an allotment or material believing, in good faith, that he would make the Class B product himself and finds that unforeseen contingencies prevent him from doing so.

Where the customer designs and engineers a product and it is his practice to subcontract for the production of all or a portion of products which he designs and engineers and the actual manufacturer is not in a position to anticipate requirements of materials and components needed for making it.

In both of these cases, CMP-4B applications would be filled by persons other than the actual manufacturer. In both of these cases, however, according to Direction No. 36 as amended Nov. 21, CMP Regulation No. 1, manpower information submitted on Form WPB-3820 (Revised) must be applicable to the plant of the manufacturer rather than the plant of the persons filing the CMP-4B application. Form WPB-3820 (Revised) must be signed by the manufacturer operating the plant in which the work is to be done. It must identify the manufacturer and the plant to which it relates.

The Direction also points out that if the product is to be made in more than one plant, separate manpower forms must be filed for each separate manufacturer and plant.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Manpower Problems Delay Metal Drums

Washington

• • • Steel supply is generally believed to be adequate for the free production of metal drums, WPB officials have pointed out, but the continuing manpower shortage may limit output. The officials drew attention to this situation in response to a recommendation made at a recent meeting of the Steel Shipping Container Industry Advisory Committee that L-197, which restricts the use of steel drums and pails, be revoked.

Industry members were reminded that every production increase, whether or not a manpower increase is involved, must be registered on WPB Form 3820 (Statement of Manpower Information) so that the number of workers may be checked in relation to output. The use of this form would continue even if L-197 were revoked, WPB officials pointed out.

The CONE AUTOMATIC MACHINE COMPANY



sees many

GOOD THINGS AHEAD

It is reported that

The soybean is now the third largest cash grain crop in the United States.

get ready with CONE for tomorrow

Aluminum can now be chemically bonded to steel so that the two become a completely integrated unit. This process has already contributed greatly to improvement in the horsepower per pound ratio of certain of our aircraft engines.

get ready with CONE for tomorrow

A 200 page book may now be printed on both sides of a 6 x 9 inch sheet and enlarged for reading by the use of a new machine. This would bring the cost of books to about five cents per volume. It is estimated that a full size encyclopedia, printed by this method, would cost about three dollars.

get ready with CONE for tomorrow

One authority states that oil can be produced from American shale in commercial quantities and at a competitive price.

get ready with CONE for tomorrow

Zein, the new shellac substitute derived from corn, is being used in shoe soles and heels, cements, rain coats, mats, gaskets, and rubber stamps. Packaging films, textile fibers, and bottle caps may be expected later.

get ready with CONE for tomorrow

Most radical of all the new power plants is one in which the fuel is burned in gas mantles and the radiant energy produced is converted into electricity by photo-electric cells.

get ready with CONE for tomorrow

Pure iron can now be deposited on non-metallic substances. By this method a surface of iron may be put on a base of rubber, wood, or plastic.

Some of the new paper-resin laminates may now be formed as easily as a cook lines a plate with pie crust, and require pressures as low as 50 lbs. per square inch.

get ready with CONE for tomorrow

Glass fabric impregnated with synthetic resin is a new material with extraordinary properties. Tensile strength may be more than 80,000 lbs. per square inch.

get ready with CONE for tomorrow

Five states have pooled their electrical generating capacity with results equalling the addition of 135,000 horsepower. This practice is expected to spread.

Aerial photography can show whether the soil of a particular area is gravel, sand, silt, or clay.

get ready with CONE for tomorrow

A new lacquer can be baked on to metal surfaces and removed by heating above 212° F.

get ready with CONE for tomorrow

An experimental Diesel engine weighs only eleven ounces per horsepower and can operate on either Diesel oil or gasoline.

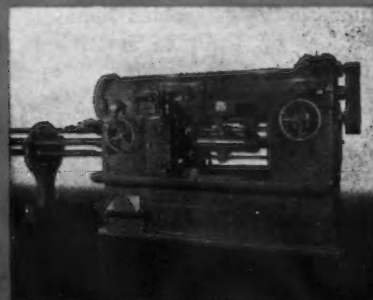
get ready with CONE for tomorrow

A Canadian manufacturer of railroad equipment has designed a flat-car to be used as a landing place for helicopters.

get ready with CONE for tomorrow

The "axonograph" is a device that photographically produces an axonometric drawing directly from a blueprint.

*This machine cuts
its own weight
in metal in
four days*



3 1/2" 6-Spindle Conomatic

To produce the part shown, 6 pounds of chips — over a sixth of a ton of metal per hour — were removed from WD1314 bar stock.



CONE

AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U. S. A.

• No support for Senator Pat McCarran's "Freeze the East and Favor the West" plan from Representatives of West Coast private industry and commerce . . . Geneva mill already facing competitive sales problem.



SAN FRANCISCO—I'd expect statements like we've heard from eastern Chambers of Commerce, but not here" scolded Senator Abe Murdock of Utah as statement after statement by far western business men and representatives of commercial organizations were made before the recent three-day hearing here by the Senate Committee on Decentralization of Industry opposing the Committee's suggestion that eastern and midwestern DPC industrial plants and facilities be frozen while and until competitive facilities in the South and far West should develop and operate post war.

At the conclusion of three days of varied, confused, incongruous and ill-digested testimony, Senator Pat McCarran of Nevada, chairman and senior parting in producing what proved to be pretty much a boomerang performance thanked the by that time harassed commercial and business witnesses somewhat as follows:

"We appreciate your coming here at your own expense to testify but we can't understand your opposition to this Committee's report of Oct. 7 demanding government directed decentralization of eastern industry. Seven billion dollars have been invested by the Government in factories in the overcongested, overindustrialized 11 eastern states. Since western plants can't be sold to private industry until

after the defeat of Japan, eastern plants should not be sold after the war with Germany and allowed to get the jump on the West in civilian production. If you gentlemen oppose our plan, you should come here with a constructive substitute that is going to assure the continued operation of our aluminum and magnesium plants and our steel mill in Utah. What do you propose?"

For several months committee representatives had been canvassing the Pacific Coast for witnesses from western industry to develop sentiment and complete the record, but genuine representatives of commercial industry and finance sidestepped and stayed away, sending representatives to hear what was said but to avoid the cross-questioning and biased, impractical, political objectives of the two wily senators who were there to grind their axes. Almost any opposing neck was in danger. Provincial prejudice, anti-monopoly fetish and belittling of business and independent enterprise were in the saddle to take realistic, practical experienced operators for a ride.

W• C. MULLENDORE, president of the Los Angeles Chamber of Commerce, frankly opposed "divisive sectionalism" and suggested that a balanced economy can only develop from freedom to work out regional specialization according to comparative advantages for various occupations in different regions. "In our opinion, the very complex and difficult task of discovering and bringing out a more advantageous distribution of industry and population can best be accomplished by local or private industry . . . through actual trial and error experience of interested individuals and groups, searching for the location which will be most advantageous for them individually. . . . After the end of hostilities in Europe and Asia it is our opinion that war production should be maintained in the West and South only insofar as it is needed for national defense and only insofar as it can be carried on more economically in those areas."

Mr. Mullendore is executive vice-

president of the Southern California Edison Co. and as such is a realistic industrialist and practical economist. He pointed out that the East is the West's best customer and that the committee's "Graphic Guide to Decentralization" casts doubt and suspicion on the economic future of the far West and at the same time antagonizes citizens in other communities east of the Rockies. "Industries which are dependent upon government subsidies or favoritism for their establishment or survival are likely to remain weak and dependent, and government discrimination against one section of our country in order to try to build up another is not in accord with either the tradition or genius of the American people."

In general, what other few business men had the temerity to testify as presidents of Chambers of Commerce were unanimous in discouraging government subsidies, politically planned economy, stipulated guarantees of operation in the disposal of DPC plants, or other political panaceas to industrialize the West Coast post war by fiat or largesse.

PROFESSOR J. R. MAHONEY, director of economic and business research at the University of Utah, who has compiled complete and basic data on Utah iron and steel operation, again proposed that a post war investment of from \$30,000,000 to \$40,000,000 would be additionally required to convert the Geneva mill for peacetime practical usefulness in supplying and advancing the industrial maturity in the far West. He suggests conversion of part of the plate facilities, adding a continuous strip mill, both cold reduction and hot rolled sheet mills and a tin plate mill. As a basis for the sale and continued operation of the plant, he suggested that the original cost should be adjusted to the figure that a private operator would have paid for construction of the plant in peacetime. Furthermore, since the total size and capacity of the plant is greater than would have been justified for normal peacetime operation, in conversion a private operator should be permitted to assume a capital cost of only part of the plant's

... it is later than you think!

Plan Now to EX-CELL-Oize

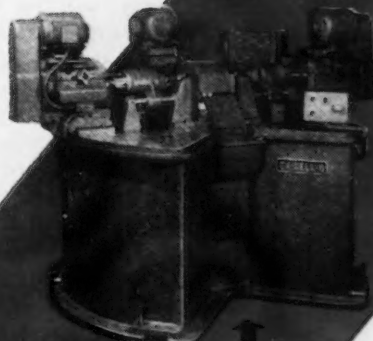
for Tomorrow's Production Needs

NOW is the time to prepare for needs immediately ahead . . . for tomorrow's keener competition that will make more efficient production methods essential. Your production problems may readily be solved by special-purpose machines that perform multiple operations . . . machines designed and built to meet your specific requirements. Ex-Cell-O has had many years of practical experience in precision engineering special-purpose machines that combine improved accuracy and finish with greater production and worthwhile economy. Get in touch today with Ex-Cell-O at Detroit or with any of its field engineers in 32 other industrial centers both in the United States and Canada.

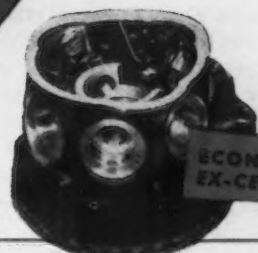
EX-CELL-O CORPORATION
DETROIT 6



Special Ex-Cell-O Machine to drill four grooves in aluminum alloy plates



Special Ex-Cell-O three-way machine to drill 40 holes in body of alloy steel sleeve



ECONOMIZE TIME
EX-CELL-O WAY

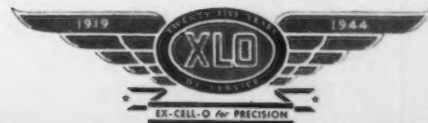
PART: Aircraft motor accessories drive housing

MATERIAL: Magnesium

OPERATION: Finish bore and face five periphery holes

MACHINE: Ex-Cell-O No. 61 Cylinder Boring Machine

One Ex-Cell-O machine now does the work on this part where previously four other machines were required. The big saving in machines, fixtures, operators and floor space is readily apparent.



EX-CELL-O makes:

SPECIAL MULTIPLE WAY-TYPE
PRECISION BORING
MACHINES

SPECIAL MULTIPLE PRECISION
DRILLING MACHINES

PRECISION BORING,
TURNING AND FACING
MACHINES AND FIXTURES

PRECISION THREAD
GRINDING MACHINES

PRECISION LAPPING
MACHINES

PRECISION BROACH
SHARPENING MACHINES

OTHER SPECIAL PURPOSE
MACHINES

BROACHES AND BROACH
FIXTURES

GRINDING SPINDLES

DRILL JIG BUSHINGS

CONTINENTAL CUTTING
TOOLS

TOOL GRINDERS

FUEL INJECTION EQUIPMENT

R. R. PINS AND BUSHINGS

PURE-PAK PAPER MILK
BOTTLE MACHINES

Where increased production, high accuracy, and greater economy through multiple operations are required . . . consult EX-CELL-O.

adjusted valuation, for example, 50 per cent, or an amount equal to the usable capacity of the plant. If and when the post war operator could and would use all the present plant he could then assume the additional capital investment.

Other practical industry men have been suggesting informally that perhaps a postwar operator might take over on a flat license or rental fee per ton produced. Even the grocery clerks among far western industrialists who are long on ambition and short on capital assets could agree to pay the government or DPC \$4.00 or \$5.00 a ton for every ton produced and thus husband their capital for sales, to develop markets and for the judicious and economical purchase of raw materials and for the sizable operating capital required.

Incidentally, it is understood that the Geneva Steel Co. is beginning to face a sales problem right now, even under the war emergency. Coast shipyards still require a lot of plates for new construction, even under present contracts, through June or July, 1945, but substantial tonnages have been allocated to eastern and other mills and there is an impression that allocations may be removed by February. If inter-coastal water shipments should be resumed, under an open market, there might be a slight preference for plates from the East Coast, laid down at Pacific Coast ports for \$52 a ton, instead of Geneva Fontana plates laid down at Pacific Coast shipyards for \$64 a ton.

Instead of raising Geneva's position on the labor preference rating list, WMC even cancelled the B-priority when WPB admitted that plates were easier, that warehouse directives might be lifted in December and plate and shape allocations in February.

What to do with Geneva may pass from the area of theory to face-to-face reality very, very soon.

FROM such stray straws as the following, thoughtful observers draw inferences about the future course of far western industry:

For scrap aluminum storage a 40-acre plot has been set aside by the Government at Camp Haan, Riverside, Cal. Several million pounds of aluminum scrap will be shipped in monthly from West Coast aircraft plants for outdoor storage.

Two new drydocks to cost approximately \$5,000,000 have been approved by the U. S. Maritime Commission for installation at the Moore yard on the Oakland estuary. The largest will accommodate vessels of around 18,000 tons.

Vanport City, second most populous metropolis in Oregon, covering 790 acres with over 18,000 housing units, is being proposed as a model post-war industrial area and an ideal site for upwards of 50 industries now interested in locating plants near Portland. Like Venus, full grown from the foam, Vanport sprung up from rolling fields in four years to house Vancouver and Portland shipyard workers.

Congressman Richard J. Welch of California, who suspects all big steel men and trusts all sponge iron plants, is proud to proclaim that the never-discouraged U. S. Bureau of Mines will install an experimental four-ton electric furnace at Shasta Dam for "preliminary reduction of California iron ores."

Contracts for an additional one and one-half dollars have been awarded to the Kaiser shell plant at Denver by Army Ordnance for the manufacture of fuzes and boosters.

The last five or ten C-4 type 18,000 ton troop transports contracted by Kaiser-Richmond yards will be built at Kaiser-Vancouver yards in order to free Richmond Yard No. 3 for Navy repair work. Even this switch leaves five or six months' new construction at the rate of two ships a month, at Yard 3, Richmond. Two of the yard's five graving dock basins will be deepened and extensive finger piers and outfitting docks will be added.

Shipyard workers employed during all four quarters of last year in the Portland area had an annual income of \$3,001.00, according to figures of the Oregon State Unemployment Commission, based on the earnings of 65,050 employees. Twenty per cent of all shipyard workers earned upwards of \$3,000 during the year and fewer than one in 20 earned more than \$4,000. Shipyard workers represented 35.2 per cent of all workers covered by unemployment insurance in Oregon.

FIG IRON DEMAND DIMINISHES: Pig iron production has declined slightly in recent weeks, mainly because of lower demand. Fifteen blast furnaces were idle Nov. 1 for lack of an outlet for pig iron or for lack of need for hot metals, according to the American Iron & Steel Institute. Nine other furnaces idle upon that date were being repaired while five additional units were inactive for other reasons. One other furnace, completed last summer, has not yet been put into production because of lack of need for the pig iron it could produce.

Blast Furnace Capacity and Production—Net Tons

	Number of Companies	Annual Blast Furnace Capacity	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
			October	Year to Date	October	Year to Date	October	Year to Date	Per Cent of Capacity	
									October	Year to Date
DISTRIBUTION BY DISTRICTS:										
Eastern.....	10	12,749,570	897,422	9,279,269	25,096	218,304	922,518	9,507,593	85.4	89.2
Pittsburgh-Youngstown.....	15	26,870,760	2,108,130	21,075,744	20,207	195,405	2,128,337	21,271,149	93.5	95.0
Cleveland-Detroit.....	7	6,620,500	532,747	5,202,166			532,747	5,202,166	95.0	94.3
Chicago.....	7	14,063,510	1,094,692	11,041,860		8,780	1,094,692	11,050,640	91.9	96.3
Southern.....	8	5,039,470	353,394	3,450,756	12,603	137,886	356,057	3,588,622	85.7	89.9
Western.....	4	2,841,100	155,824	1,416,539			155,824	1,416,538	64.7	66.4
TOTAL.....	35	68,184,910	5,142,209	51,476,353	57,966	560,355	5,200,175	52,036,708	90.0	92.6

During 1943 the companies included above represented 99.5% of the total blast furnace production as reported to American Iron & Steel Institute.

INDUSTRY'S NEW TOOL OF MULTIPLE USES

It's your right hand in a new form!

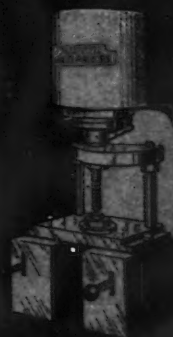


MULTIPRESS is a new kind of machine tool! Compact, streamlined, completely self-contained, this bench-size oil-hydraulic "work horse" packs up to 4 tons of accurately controlled power, and adapts that power to an amazingly wide range of operations. Standard fixtures and accessories extend its applications to almost every type of work calling for *pressure*—sustained or in repeat strokes . . . in single or automatically repeated cycles . . . synchronized with indexing tables or other feed mechanisms.

The basic unit alone, without any of its many accessories, delivers downward ram pressures of from 300 to 8000 pounds . . . upward pressures to 5000 pounds . . . strokes of from 1/16 inch to 6 inches . . . ram speeds up to 200 inches per minute downward, or 300 upward. Work table measures 10 1/2 x 16 inches. Opening between ram and work table is 11 inches. Write today for complete details on MULTIPRESS, the NEW tool of Industry's Right Hand.



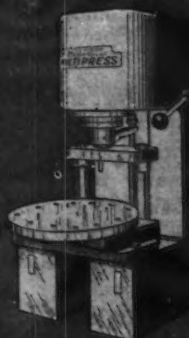
With Straightening Fixtures



With Broaching Attachment

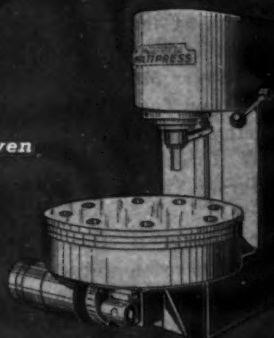


With Hopper and Dial-Type Feed

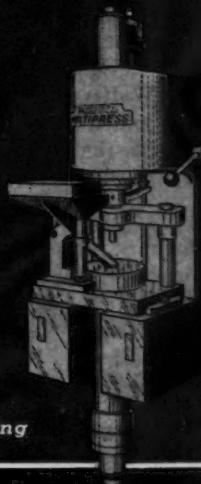


Showing Dial-Type Feed

With Motor Driven Indexing Table



Equipped for Automatic Pelleting



With Honing Fixtures



Basic Unit
\$575.00

Patents Applied For

The DENISON Engineering Co.

1158 Dublin Road

Columbus 16, Ohio



INDUSTRY'S RIGHT HAND

DENISON
EQUIPMENT in APPLIED
Hydrolics

PERSONALS

• **Kenneth McCreary** has been elected president of the Goetze Gasket & Packing Co., Inc., New Brunswick, N. J. Mr. McCreary, who has been associated with the company since 1932, has served consecutively as assistant to the president, vice-president and treasurer.

• **John M. Mille**, manager of the Arsenal machine shop of the Pittsburgh Steel Foundry Corp., Glassport, Pa., has been appointed assistant to Frank Cordes, president of the corporation. Mr. Mille was formerly vice-president and works manager of the Lewis Foundry & Machine Co.

• **John W. Moxon**, has been elected secretary-treasurer of the Carpenter Steel Co., Reading, Pa. Willard E. Roberts has been named controller; Paul B. Greenawald, associated with the Carpenter Steel Co. for 20 years, has been appointed general superintendent of mill operations; and George V. Luerssen for 37 years with the metallurgical department, has been appointed assistant chief metallurgist.

• **David Newhall** has been appointed vice-president in charge of the New York district, Iron & Steel Products, Inc., Chicago.

• **L. J. Kramer** has been made superintendent of the Lapweld Tube Department, Allegheny Ludlum Steel Corp., Brackenridge, Pa. Mr. Kramer succeeds the late Charles Rupert.

ROBERT W. BIGGS, manager of the McKeesport works, Jones & Laughlin Steel Corp.



• **John A. Nelson** has been appointed vice-president in charge of metallurgy and research for the Braeburn Alloy Steel Corp., Braeburn, Pa. Mr. Nelson had previously been chief metallurgist.

• **S. M. Rust**, retiring president of the Rust Engineering Co., Pittsburgh, has been elected chairman of the board, and S. M. Rust, Jr., who has been serving as executive vice-president, has been elected president of the company.

• **E. L. Milford** has been made head of the Chicago office of the American Gas Furnace Co., Elizabeth, N. J., to succeed William J. Barendscheer, retired, and George A. F. Machlet has been made head of the newly established Milwaukee office.



SAMUEL McCLEMENTS, assistant manager of sales, Railroad Materials and Commercial Forgings Division, Carnegie-Illinois Steel Corp.

• **Robert W. Biggs** has been appointed manager of the McKeesport works, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Biggs, who has been production manager at the McKeesport works since March 1943, succeeds the late Walter B. Minch. In 1938 Mr. Biggs joined Jones & Laughlin as assistant to the superintendent of the Tube Division at Aliquippa, Pa.

• **John J. Bognar**, formerly chief of the Finishing & Treating Section, WPB Consumers Hard Goods Bureau, has joined the Hanson-Van Winkle-Munning Co., Matawan, N. J., as a field representative in Chicago.

• **Lyman H. Bellows** has been appointed sales manager of the Sheldon Machine Co., Inc., Chicago.



ORRIN H. BAKER, manager of sales, Railroad Materials and Commercial Forgings Division, Carnegie-Illinois Steel Corp.

• **Orrin H. Baker** has been made manager of sales for the Railroad Materials and Commercial Forgings Division, Carnegie-Illinois Steel Corp., Pittsburgh, and **Samuel McClements** has been made assistant manager of sales. Prior to his present appointment, Mr. Baker was Pittsburgh district manager of sales for the same division. Mr. McClements has been associated with the sales department of Carnegie-Illinois in various capacities since 1919, having been assistant manager in the Pittsburgh office since 1936.

• **Price R. Reid** formerly general manager of the Concan Ordnance Co., a Continental Can Co. subsidiary which was dissolved early this year, has been appointed assistant division manager of operations of Continental's Eastern division; **E. R. Brodoon** has been appointed plant manager of Continental's Molded Plastics Division at Cambridge, Ohio; **K. W. Bromley** has been made chief engineer; **J. Roger McManus** has again been appointed factory manager of the company's plant in Oil City, Pa., and **G. W. Crabtree**, factory manager in the Jersey City plant.

• **George S. Eaton** has been named executive secretary of the National Tool & Die Manufacturers Association, Cleveland.

• **James E. Power** has been appointed Eastern sales manager of the Mechanical Goods Division, United States Rubber Co., New York.



MARTIN J. CONWAY, manager, Petroleum Division, Lukens Steel Co. and subsidiaries.

- **Martin J. Conway** has been appointed manager, Petroleum Division, Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., Coatesville, Pa. Mr. Conway joined Lukens Steel Co. in 1926 as fuel engineer and continued in that capacity until 1940 when he transferred to the Sales Department as special engineer.
- **A. Stull Harris**, son of the founder of Harris-Seybold-Potter Co., Dayton, Ohio, has been appointed president of the firm. **R. V. Mitchell**, who has served as president for 22 years, has become chairman of the board of directors and chairman of the executive committee.
- **Frank Jardine** has been made manager of the Development Division, Cleveland branch of Aluminum Co. of America, Pittsburgh; **John R. Willard** has been placed in charge of the Sales Development Division, New Kensington, Pa.; and **B. J. Fletcher** has been appointed chief engineer of the New Kensington branch. All three men are Alcoa veterans. Mr. Willard and Mr. Fletcher have been with Alcoa for the past 18 years, and Mr. Jardine has been with the organization for 26 years.
- **R. H. St. John** has been appointed manager of the Albany branch of the Westinghouse Electric Supply Co., New York. Mr. St. John has replaced **Alger Reilly**, who has been transferred to the Newark branch of the company.
- **Richard S. Johnson** has been appointed research engineer on the staff of Chief Engineer Charles S. Schroeder of the Philadelphia division, Yale & Towne Mfg. Co., Stamford, Conn.

• **R. W. Davis** has been appointed general manager of the Norwood, Ohio, works of Allis-Chalmers Mfg. Co., Milwaukee. Previous to a two-year leave in which he served as director of the WPB Electrical Equipment Branch, Mr. Davis was assistant manager of the electrical department at Allis-Chalmers.

• **W. O. Moley**, formerly assistant to the manager of bar and semi-finished sales of the Carnegie-Illinois Steel Corp., Pittsburgh, has been appointed as the new chief of the Shell Steel Section of the WPB Steel Division Carbon Bar and Semi-Finished Steel Branch. Mr. Moley has succeeded **E. K. Waldschmidt**, formerly with the Jones & Laughlin Steel Corp., Pittsburgh, who is one of the five iron and steel experts accompanying Donald M. Nelson to China to set up a WPB in that country.

• **John J. Murphy** has been appointed purchasing agent of Atlas Metal Stamping Co. and Atlas Tool & Designing Co., Philadelphia. Mr. Murphy was previously connected with the Collins & Aikman Corp. for 25 years.

• **J. Ringen Drummond** has been appointed assistant factory manager of the Timken Roller Bearing Co., Canton, Ohio. Mr. Drummond joined the company in 1926 as chief inspector and later became assistant superintendent of the Columbus plant. He has been doing experimental engineering in the Canton plant since 1932.

• **Isabella A. Romans**, formerly with Chloramine Corp.; **Dr. George McCoy**, formerly instructor of Organic Chemistry at the University of Pennsylvania; **Ward W. Whitebread** of General Chemical Co.; **Savin Green** of Lion Oil Refining Co.; **Savin Zavarella** of Pratt Whitney Aircraft Corp.; **Harold B. Staley** of Cochrane Corp., and **Dr. Frank W. Panepinto** of the Warner Co. have joined the research and development staff of the Pennsylvania Salt Mfg. Co., Philadelphia.

• **James Swanson** has been appointed assistant purchasing agent, Clark Equipment Co., Buchanan, Mich., and will have charge of all buying activities for Clark Tractor Division at Battle Creek. Mr. Swanson succeeds the late **D. E. Leach**.

• **James E. Norcross** has been appointed sales manager and **Albert M. Taylor**, superintendent of the two plants of the Arcos Corp., Philadelphia.

OBITUARY...

• **Robert L. Peoples**, 61, production manager of the National Aluminum Mfg. Co., Peoria, Ill., died November 13. Mr. Peoples formerly was with Cutler-Hammer, Inc., Milwaukee.

• **William S. Horner**, retired steel and iron industrialist, died November 15 at the age of 76. Mr. Horner organized and was president of the Pittsburgh Shovel Co., and in later years became affiliated with the American Rolling Mill Co., first as a director and later as vice-president and a member of the executive board. He was one of the founders of the National Association of Sheet and Tin-plate Manufacturers.

• **William H. Barr**, a former president of the National Founders Association, Chicago, and one of the organizers of the Lumen Bearing Co., Buffalo, died November 17. Mr. Barr had served as president of Lumen Bearing Co. for about 25 years. In 1925, he organized his own firm, William H. Barr, Inc.

• **Walter W. Mohr**, 48, chief engineer and a member of the engineering staff of the Edward Valve & Mfg. Co., Inc., East Chicago, Ind., for 24 years, died November 13.

• **Milo A. Harris**, 58, vice-president in charge of sales and a director, Newmann-Crosby Steel Corp., Pawtucket, R. I., died November 16. Mr. Harris had been with the company for more than 30 years.

• **Dudley H. Miller**, president and director of Speer Carbon Co., Niagara Falls, N. Y., died November 8. Mr. Miller was also president and director of International Graphite & Electrode Corp.; International Graphite Corp. of Canada, Ltd.; Speer Resistor Corp., and executive vice-president and director of the Duriron Co., Inc.

• **George L. Spence**, 63, retired manager of manufacture for the American Can Co., New York, died recently in Maitland, Fla. Mr. Spence retired in 1943 after 40 years with the company.

• **Henry E. Miller**, who resigned in 1939 as general works manager of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., died in Arlington, Mass., November 17. Mr. Miller was 74 years old.

• **Roy D. Hunter**, director and former general sales manager of the Sullivan Machinery Co., Claremont, N. H., died November 14. Mr. Hunter was 71 years old.

Fatigue Cracks . . .

BY A. H. DIX

World Shaper in Uniform

• • • The most startling nugget that Jack Hight of the brains department mined at the recent International Business Conference in Rye, N. Y., came to him not in open meeting but as the result of unwitting eavesdropping. He was waiting for a call to be put through, when he heard this conversation outside his booth:

Voice "A"—"Well, it all resolves into this, this whole country is run by the British."

Voice "B"—"I don't know what can be done about it; I've done all I can. I see no other way out. We've got to have another industrial revolution."

Our man peered through a crack in the door. Voice "A" belonged to a staid, dignified, Latin-looking delegate; Voice "B" to a Westchester Country Club bellhop.

Knife and Scissor Men

• • • One of your readers asks for a name to apply to people who clip publications before others have read them. What's the matter with the old name? You know, the one consisting of four short words.

—E.M.R.

It will do for the unimaginative, but our inquirer wants something tailor-made. Best suggestion so far: *cliptomaniac*.

Cure for Cliptomania

• • • Cliptomania is an especially anti-social ailment in the case of your favorite family journal, most of whose subscriptions are in company names. We are told by our research director, Oliver L. Johnson, who is up on such things, that the average number of readers per copy is 5.25.

Thus the volume of teeth-gnashing caused by the cliptomaniac is in descending scale. If the cliptomaniac is reader No. 1, he causes 4.25 maxillary and sub-maxillary clashes. If he is reader No. 5 there is only 0.25 clash, or really only a minor brush.

If the clipper is a sadist, nothing can be done, but if his act is motivated by a craving for the article or item clipped, he can restore to himself the clear-eyed look of the righteous by getting into the habit of writing to this journal's ever-obliging Reader Service Department, and asking for clippings.

Exhibitionists All

You may augment by one the list of those who await the weekly puzzle. My avidity is quenched only when one of the elect, whose name precedes mine on the routing slip, proudly pencils in his solution.

May I suggest a few words of criticism . . .

—I. C. Eppley,
Dayton Power & Light Co.

This is a mild form of exhibitionism, afflicting most of us. Archimedes had a touch of it. The cure is simple: withhold the answer, and pencil in margin "I solved it," followed by initials.

Pearl Diver

• • • Spurred by the sweet rain of publicity that Claire Luce precipitated when she coined the combination word *globaloney*, our commercial editor, T. Carlyle Campbell, went into the silences recently. When he came to he had *balarney*, which you will recognize instantly as a marriage of *baloney* and *blarney*. If you stand it, *balarney* can be further welded to the Luce invention, giving you *globalarney*.

Combination words are something we can take or leave alone, like child actors, trained animals, and Cuba libres. But we promised our friend T. Carlyle we would give his baby a plug, and this is it.

High Cut Vest, Glasses

• • • On page 95 of your Nov. 16 issue is a photograph of Oliver Lyttleton, British minister of production, and John H. Van Deventer, your pres. and ed. dir., but the caption fails to say which is which. My guess is that Van is the man on the right, as he has a high cut vest which in England would be strictly for "country wear," and he is wearing glasses, which most Englishmen will not tolerate until approaching absolute blindness.

—Deac



From left to right: (1) Oliver Lyttleton, (2) John H. Van Deventer (deev'-en-ter).

Call for Literate Latvian

• • • E.M.R. is finger man for this typographical error in the Nov. 2 story on shot peening, "*Two factories tend to mitigate the damage due . . .*" The error is easily explained. Once embarked on the f-a-c-pattern, the linotype operator's fingers followed it to the familiar end.

Ignoring your yawns we will also explain why the error was not caught in proofreading. It occurred near the end of the word. Quick reading accustoms the eye to identifying words by the first few letters. The remaining letters are taken for granted.

If our print shop can get into the habit of confining its errors to the first syllables, typos in your favorite family journal will drop sharply. There is still another remedy. Harry Duffy, who runs our print shop, says the perfect proofreader is one who has no knowledge of the language in which the proof is set. Being able to identify no words, he examines every letter. If you know of a fairly literate Latvian with an ingrown distaste for English you might drop us a line.

Uninhibited Philadelphian

• • • Our slogan, "The World's Greatest Industrial Paper," has been kept under wraps the last couple of years, for fear that it is immodest. But if carried to extremes, modesty becomes a vice and can be more objectionable than the most unabashed display of self-appreciation. Jules (Enterprise Galvanizing Co.) Rubin provides us with a prime example of freedom from this vice, clipped from the situations wanted pages of a Philadelphia newspaper:

At large the world's best salesman. Great reward to the firm that can appreciate rareness. Qualifications surpassed by none. Yes, one in millions, and he's yours for the asking. Good pay guarantee required. Box C-185.

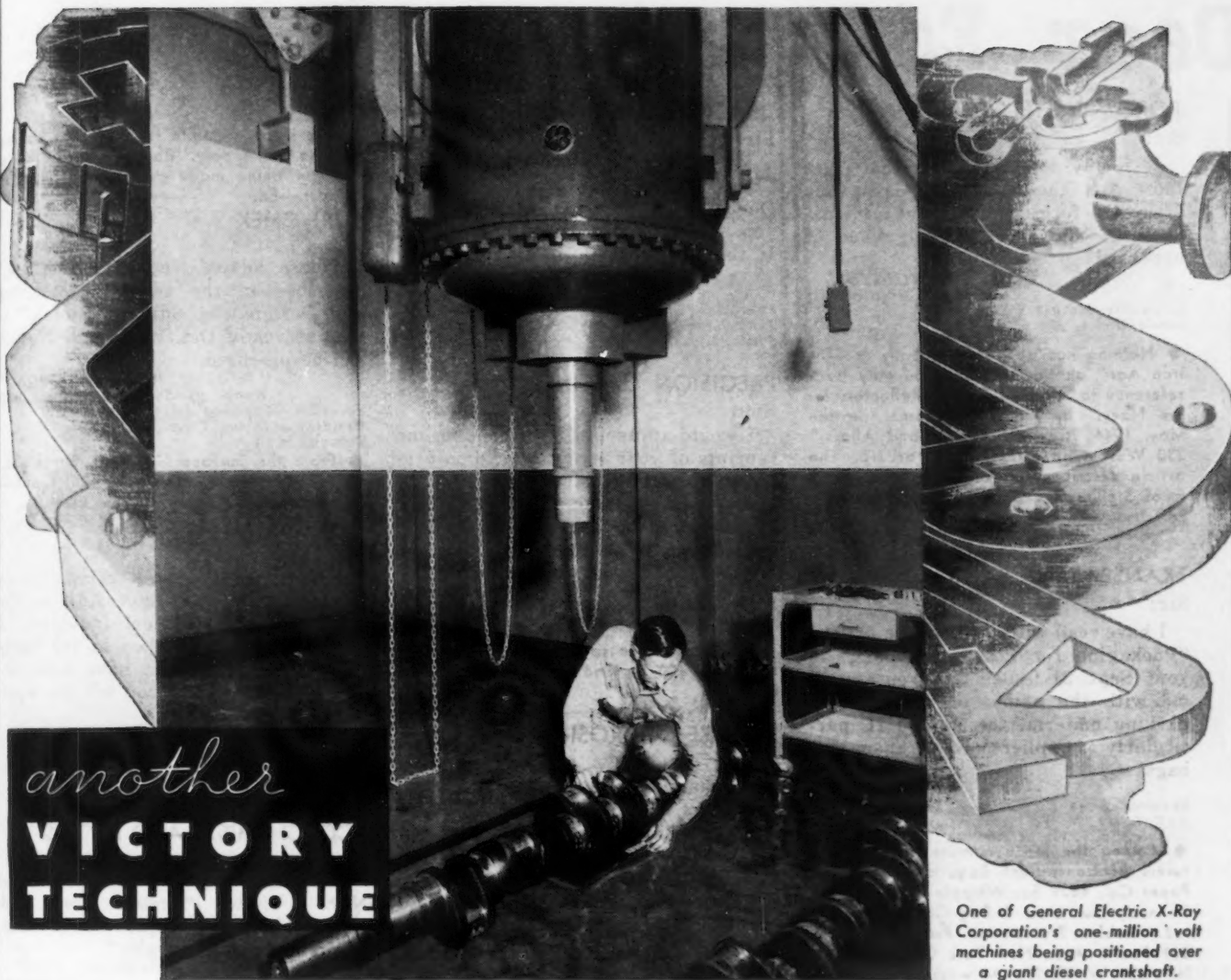
Say \$28 a week?

Puzzles

• • • Last week's unscrupulous woman got 73 per cent of the yarn, which made a ball of 7-in. dia.

Methods of expressing 32 by means of five 3s continue to pour in. Latest pourers include Andre (OWI) Lion, W. B. (American Bridge) Miles, R. A. (Freyn Engineering) Powell, W. H. (Hyatt) Chapman and Majorie (Pratt & Whitney Aircraft, Kansas City) Patterson. Mr. Lion submits the problem of the week:

What is the highest figure that can be expressed with five 3s?



another **VICTORY TECHNIQUE**

One of General Electric X-Ray Corporation's one-million volt machines being positioned over a giant diesel crankshaft.

X-RAY NOW REVEALS HIDDEN SECRETS OF METAL

Most mysterious of new war-promoted metallurgical processes, the inspection of metallic structures by ever-more-powerful x-rays is one of the most practical. Inspired by the demands of army and navy, the production of all kinds of war equipment and munitions thus has not only been speeded up to unheard of proportions but safety and dependability in performance have been increased many times over.

Making spot checks on castings, developing routine casts, inspecting welds, or operating on a production line basis, x-ray machines powered up to two-million volts are giving certainty to a metallurgy previously working in the dark.

One out of many Victory Techniques that are helping to win the war, the new x-ray technique is typical of the processes, treatments, methods and assemblies that industry must adopt in order to produce competitively in peacetime at low cost and make jobs for everybody. *You must learn what these new techniques are. Talk with the ex-*

perts who call on you—your machine-tool man, your electrical equipment representative, your contact people for materials and services of every kind.

Your Lindberg Furnace representative can help you in ways you may not suspect. Invite him to talk freely about your metallurgical problems.

LINDBERG ENGINEERING COMPANY
2452 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS

Lindberg
FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering

CYCLONE for accurate, low-cost tempering and nitriding

HYDRYZING for scale-free and decarb-free hardening

Dear Editor:

FORGING STELLITE

Sir:

It is my understanding that THE IRON AGE has carried at least one article on forging of Stellite or Hastalloy C. Can you tell me when it appeared?

L. E. PENNINGTON,
Plant Metallurgist
Reynolds Metals Co.,
Louisville 1, Ky.

● Nothing has appeared recently in "The Iron Age" on this subject. You may have reference to "Formed Stellite Reflectors for the Navy," by Henry G. Horner, in the May, 1944, issue of "Metals and Alloys," 330 West 42nd Street, New York 18. The article describes hot forming at 2100 deg. F. of Stellite 6 and Hastalloy C plates.—Ed.

TRANSPARENT BAGS

Sir:

I have read with interest the article, "Packaging for Postwar Export," in your Sept. 21 issue. Can you supply me with the names of suppliers of packing material for Method II, particularly suppliers of transparent bags?

ROBERT FUNK
Spencer Lens Co.,
Buffalo 11, N. Y.

● Among the large number of manufacturers of transparent bags are: Cromwell Paper Co., 4829 So. Whipple St., Chicago; Kennedy Car Liner & Bag Co., Shelbyville, Ind.; Robles Transparent Products Corp., 219 Fourth Ave., New York City; Milprint, Inc., 431 W. Florida, Milwaukee, Wis.—Ed.

TUFFITE

Sir:

Can you tell us who manufactures cast iron alloy Tuffite No. 4, which contains 2 per cent nickel?

A. H. BLAISDELL,
Research Engineer
American Society of Mechanical
Engineers,
Special Research Committee on
Forging of Steel Shells,
First National Bank Building,
Pittsburgh 22

● A canvas-impregnated phenol plastic has this trade name. American Fork & Hoe Co. uses the trade name Tuffite for some of its products. In Chicago the Tough-Lite Process Co. makes tools and bits, but we know of no metal or alloy manufactured under the trade name Tuffite.—Ed.

SONIGAGE

Sir:

Where can we get more information on the "Sonigage" discussed on page 59 of your Nov. 9 issue?

P. M. ZIMMERMAN,
Industrial Engineer
Detroit Aluminum & Brass Corp.,
3875 Christopher Ave.,
Detroit 11

● From Wesley S. Erwin, Physics Instrumentation Department, Research Laboratories Division, General Motors Corp., P. O. Box 188, North End Station, Detroit 2.—Ed.

"BACK HOME AGAIN"

Sir:

We read with interest and feeling "Back Home Again" by J. H. Van Deventer in your Nov. 16 issue. Will you kindly supply us with 75 copies? If there is any charge kindly bill us.

LEWIS G. WILSON,
President
Precision Thermometer & Instrument Co.,
1434 Brandywine St.,
Philadelphia 30

PRECISION CASTING

Sir:

I would appreciate your sending me reprints of your recent article on precision casting. I would also like to know the address of J. Albin, author of your recent article, "Equipment and Material for Precision Casting."

HOBART J. HENDRICK,
President
H. B. Ives Co.,
New Haven, Conn.

● J. Albin is an associate editor of The Iron Age, 100 E. 42nd St., New York 17.—Ed.

BRONZE CORROSION

Sir:

We manufacture manganese bronze propellers in sizes ranging from 10-in. to 30-in. diameter, and have noticed that some of the propellers after being in salt water a few months show a distinct rust all over the blades.

We buy our manganese bronze ingot from reliable firms and are familiar with the melting process. Can you advise us if you have complaints of this nature and what is done to overcome it?

J. O. PETERSON,
Treasurer
O. P. Peterson Co.,
60 Union St.,
Portland, Me.

● Every maker of propellers is bothered by this same phenomenon, so is the Navy Department. There is no answer at the moment, but a large research project is under way. The various types of corrosion involved will be investigated, and an attempt made to associate them with grain size and metallurgical characteristics of the alloy. However, current indications are that the problem is highly complex and an answer may be a long time forthcoming.—Ed.

THREAD ROLLING

Sir:

Please advise us promptly if you can furnish six reprints of "An Appraisal of Precision Thread Rolling Practice," in your Nov. 2, 9 and 16 issues.

R. R. WASEM,
Purchasing Agent
U. S. Automatic Corp.,
Amherst, Ohio

Sir:

We are interested in securing five or six copies of . . .

H. V. BOWLBY,
Buyer
Caterpillar Tractor Co.,
Peoria 6, Ill.

Sir:

We would like tear sheets of . . .

R. J. SWEENEY,
Director of Research
Stover Lock Nut & Machinery Corp.,
Bushkill Drive,
Easton, Penna.

● The heavy demand for clippings has exhausted our supply. Reprints of the series are now being made and will be supplied at cost.—Ed.

SURF-CHEK

Sir:

Please advise where "Surf-Chek" described in the series "Measuring and Designating Surface Finish," in your issues of Oct. 19, 26 and Nov. 2 can be procured.

O. W. HITCHCOCK,
Supv. of Subcontracting Ins.
Scintilla Magneto Division,
Bendix Aviation Corp.,
Sidney, N. Y.

● From the Surface Checking Gage Co., 1937 Taft Avenue, Hollywood 28, Calif.—Ed.

CHINESE STEEL

Sir:

I have heard several comments on an article in THE IRON AGE on the Chinese iron and steel industry. I believe it was published in the early part of this year, but have been unable to find it. Can you tell me when it appeared?

CAPT. WM. P. CLARK
2301-41 St., N.W.,
Washington, D. C.

● March 16, 1944, page 64.—Ed.

SCOTCH MISTS AND MYTHS

Sir:

Mr. Van Deventer's editorial in the Nov. 2 issue, "Scotch Mists and Myths" is well accepted here. Can we have about 12 copies?

CARL G. HIPP,
Treasurer
Brown-Fayro Co.,
940 Ash St.,
Johnstown, Pa.

WELDING PAPER

Sir:

Where can I obtain a copy of a paper read at a recent meeting of the American Welding Society, held at Cleveland, on the subject of welding electrode coatings by D. C. Smith and W. G. Rinehart?

FRANK TROTTER,
General Superintendent
Cuban Mining Co.,
Cristo, Cuba

● Write to the American Welding Society, 29 W. 39th St., New York. Ask for the preprint of annual meeting papers presented at the Cleveland meeting, Oct. 16 to 19. There are about a dozen papers in the preprint. We believe the price is \$1 to non-members.—Ed.

ELECTROSTATIC SPRAYING

Sir:

The article by Harry Forsberg on electrostatic spraying in your Oct. 19 issue is extremely interesting. But details in reference to type of current, voltage, how to connect grid, etc., are not given. Where can I get them?

A. O. SCHAEFER
Atlantic Service Co., Inc.,
711 Caton Ave.,
Brooklyn, N. Y.

● From the manufacturer of the equipment, Harper J. Ransburg Co., 1234 Barth Ave., Indianapolis 7, Ind.—Ed.

You're Paying For

a **WHEELABRATOR**

But—Are You Getting
Its Benefits?



If you are still using slower, less efficient cleaning methods, you are paying for a modern airless Wheelabrator many times over. The actual money-savings which Wheelabrator cleaning makes possible are spectacular enough, but that is only part of the picture.

While you are cutting cleaning costs up to 50% or more, and saving power costs up to 80%, you are, at the same time, improving the appearance of your products, giving them a perfect bonding surface for final finishing, and speeding up shipments.

The post-war world will pose many problems. Those whose foresight and diligence has created and maintained that important intangible known as "good will" can be assured that a "buyer's market" will not be embarrassing.

Unsolicited testimonials crowding our files have letterheads reading like a "who's who in industry." However, there is so much

more to be told that it would pay you to drop us a line requesting complete information. Find out how simple it is to get what you are paying for.

And Here's the Proof

A 6' Plain WHEELABRATOR Table, installed at a large Cleveland jobbing foundry,* to replace several tumbling mills, is cleaning Meehanite castings so much faster and better that it has keyed up the entire cleaning department to higher efficiency. As a result, daily savings of over \$23.60 are being effected in cleaning costs alone. Speedier handling enables this plant to ship castings sooner, with the consequence that less storage space is required and handling expense is reduced materially.

*Name upon request.



American
FOUNDRY EQUIPMENT CO.

510 SOUTH BYRKIT STREET

MISHAWAKA, INDIANA

World's Largest Builders of Airless Blast Equipment

This Industrial Week . . .

- War Tempo Quickens Steel Orders
- Delivery on Some Items Lengthened
- New York Central Orders 200 Diesels

FOR the time being at least, urgent war needs and a substantial backlog to pick from have enabled the steel industry this week to continue a steel production and steel finishing level not far under recent peaks. All-time highs have been passed and the pressure for overall deliveries is not as pressing as it was a few months ago. But there are still several steel items on which deliveries are tight. Deliveries by the end of the first quarter of 1945 may be easier. For the next few months, however, emphasis will remain on the production of heavy shell steel, small arms ammunition and Navy building requirements.

While steel plate directives have been and will be cut further, and while the Maritime Commission has substantially reduced its current orders for plates, the belief is growing in some circles that the maritime Commission's shipbuilding program will by no means be completed by the middle of next year. At the present time the Commission's program is continuing but the seeming paradox in the falling off of maritime steel orders is due more to a balancing out of shipyard inventories accompanied with close control than it is to any current drop in the rate of shipbuilding.

EXTENSION of delivery dates productwise across the board is causing comment in some sections of the steel trade, but so far Washington officials do not seem to be alarmed about the situation. Firms holding allotments for material to be used in authorized civilian production see some of their hopes of securing desired delivery of material all but vanishing unless the present delivery situation takes a turn for the better. Some steel sources believe that if the current flurry of delivery troubles becomes too serious, production directives may be used to a greater extent as they were early this year. There is also a possibility that schedules may be frozen on tight items in order to clean up the situation. So far the government has not found it necessary to assume freight burden of dislocated territory steel shipments or to assume freight on ingots to be finished outside of the mills at which they are produced. This can be done if conditions warrant it and would loosen any log if it should develop.

THERE is evidence at some centers that the change in product mix occasioned by differences in various steel directives has brought about some decline in ingot operations. The lack of demand for ingots and semi-finished steel for the purpose of fabrication at plants other than those which produced these items has brought about some decline in raw steel output. Furthermore, the shift from plates to hot rolled sheet production has forced some cutback in raw steel output due to manpower shortages in fully processing hot rolled and cold rolled

sheets which require more manpower than in plate production. There is no indication, however, that such production difficulties will have any effect upon delivery of urgently needed war materials.

On the steel market front it was noted that bars, galvanized sheets, coated nails and structural steels were reflecting a tighter delivery situation. The Navy has crashed head-on into one of the tightest delivery items in the steel industry—galvanized sheets. Effort is being made to have some mills use idle electrolytic tinning lines for production of galvanized sheets as is now being done at two plants. The Navy, unwilling to authorize the use of cold rolled sheets, needs vast quantities of galvanized hot rolled material for housing projects.

RAILROAD news features a report that the New York Central has placed orders for 200 Diesel locomotives with General Motors, Electro-Motive Division. They are the double car 5400 hp. variety designed to move fast freight. The Illinois Central Railroad is planning 14 streamliners in its postwar fleet instead of the four presently in use. Revision of the Army 1944 railroad car program provides for completion of 38,782 units by the end of this year. The 1945 Army program calls for 26,170 units, of which 15,700 are under suspension. The New York Central has placed 1000 70-ton gondolas with its Dispatch shops and Santa Fe has ordered 500 50-ton box cars from Pullman Standard subject to court authorization. The Erie Railroad will take bids Dec. 12 on 500 50-ton box cars, and the Navy is inquiring for 100 50-ton steel sheathed box cars. Further Brazilian inquiries are also on the books. An order involving about 50,000 tons of sheet steel piling and accessories has been placed and was divided between Carnegie-Illinois Steel Corp., Bethlehem Steel Co. and Inland Steel Co.

Although THE IRON AGE steel scrap composite price is unchanged this week at \$17.08 a gross ton, markets are definitely stronger with many grades other than No. 1 heavy melting having advanced in price.

National steel ingot operations rose two and a half points to 94.5 per cent of capacity from last week's revised rate of 92 per cent. Chicago output rose 13½ points to 101.5 per cent, the previous week's figure having been corrected to 88 per cent. Cleveland's operating rate increased half a point to 99.5 per cent, while in the Birmingham district output rose five points to 99 per cent. In the Western Area operations were stepped up five points to 99 per cent. District declines occurred in Pittsburgh, down one to 93, and Detroit, down three to 97.5. Youngstown at 93; Philadelphia at 96.5; Buffalo at 90; Wheeling at 92; Cincinnati at 98; St. Louis at 92.5, and the Eastern District at 94.5 continued unchanged.

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+

INGOTS, MILLION NET TONS

Week
November
November
• R

• **PIG IRON DEMAND DIMINISHES**—Pig iron production has declined slightly in recent weeks, mainly because of lower demand. Fifteen blast furnaces were idle Nov. 1 for lack of an outlet for pig iron or for lack of need for hot metals, according to the American Iron & Steel Institute. Nine other furnaces idle upon that date were being repaired while five additional units were inactive for other reasons. One other furnace, completed last summer, has not yet been put into production because of lack of need for the pig iron it could produce. The total of 30 blast furnaces idle on Nov. 1 was 12 per cent of the grand total of 253 blast furnaces operated by the nation's pig iron and ferro-alloy producers. As of Jan. 1, 1944, only 17 furnaces were idle out of a total of 247, equivalent to 7 per cent idle. On July 1, of last year, 23 of 243 furnaces owned by producers of pig iron and ferro-alloys were idle, equivalent to 9 per cent of the total number of blast furnaces.

• **WIRE ORDERS UP**—Wire mills report high carbon spring wire in heavy demand with customers entering tonnage far into the future and many mill books filled through the second quarter on finer sizes. It is conjectured that this condition may be a reflection of the preponderance of spot authorizations for the mattress industry. Merchant wire orders are coming in from the retail trade in good volume, and jobbers are reported anxious to place similar orders.

• **STRIKES INCREASE SLIGHTLY**—There were 440 strikes in October 1944, involving 220,000 workers, and 690,000 man-days of idleness, according to the Bureau's (U. S. Department of Labor) preliminary estimates. Idleness was 9/100 of 1 per cent of the available working time. A strike of maintenance workers in a large number of Detroit plants involved the greatest number of workers and caused the most idleness during October. Two strikes at the Electric Auto-Lite Co., Toledo, Ohio, and a subsequent strike of members of the Mechanics Educational Society of America employed by more than 20 Toledo companies also contributed substantially to the figures for the month. Other large strikes occurred at the Kelsey-Hayes Wheel Co. and the Timken Detroit Axle Co., both in the Detroit area, the Combustion Engineering Co., Inc., Chattanooga, Tenn., the Globe-Wernicke Co., Norwood, Ohio, and the Pratt & Whitney Corp. of Missouri, Kansas City, Mo.

• **SPOT AUTHORIZATION MORATORIUM**—E. L. Keenan, State WMC Director, at Columbus, Ohio, has predicted a moratorium on spot resumption of civilian production if war workers continue to leave vital jobs. Asserting the nation's war program is scheduled for its highest peak in December, Keenan said "authorization will not be given" to return to civilian production if workers are needed for or can be used in war production.

• **FREIGHT CARS ON ORDER**—Although only 30,408 new freight cars were on order for class 1 railroads on Nov. 1, compared to 34,092 on order a year earlier, J. J. Pelley, president of the Association of American Railroads, told the recent AAR meeting that a total of 55,000 freight cars are either on order or scheduled to be ordered for 1945 delivery.

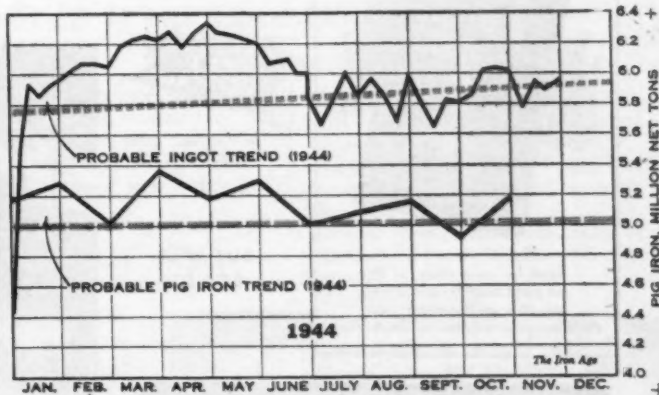
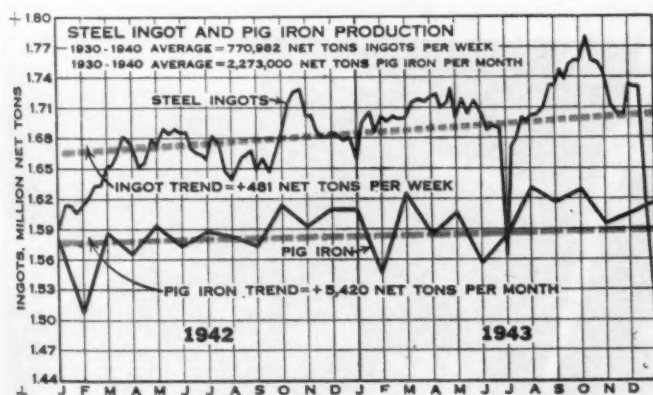
• **STEEL RECORD**—Inland Steel Co.'s No. 1 open hearth shop at Indiana Harbor recorded a new weekly production record Nov. 4 when 21,227 net tons of steel were tallied. This record exceeded the previous weekly high of 21,185 net tons produced during the week ended March 11. The shop's No. 2 open hearth established a new individual furnace monthly record during October with 8644 net tons topping the previous high of 8572 net tons produced by No. 12 furnace in January.

• **ORE SHIPMENTS DOWN**—Shipments of iron ore on the Great Lakes in October of the present year totaled 10,594,988 tons compared with 11,612,542 tons in October of 1943, according to ODT. The decline in ore shipments was attributed to increasing stockpiles and other factors. Laurence C. Turner, head of ODT's Waterways Transport Department, said that the present fleet in service on the Great Lakes is ample to take care of the government-announced quotas of all commodities for the remainder of the season.

• **TWENTY TO ONE**—Front troops have been firing 20 rounds of ammunition and shells for every single round the Germans have thrown, according to Washington reports. Desire to maintain this effective 20 to 1 ratio lies behind the strenuous emphasis today on all phases of the shell program.

• **MORE TANKERS**—Sun Shipbuilding will build five tankers for the Navy for delivery in March or April. Although being built for the Navy, this order is being handled by Maritime Commission. Orders for shapes went to Carnegie-Illinois, and for plates to Eastern Pennsylvania mills.

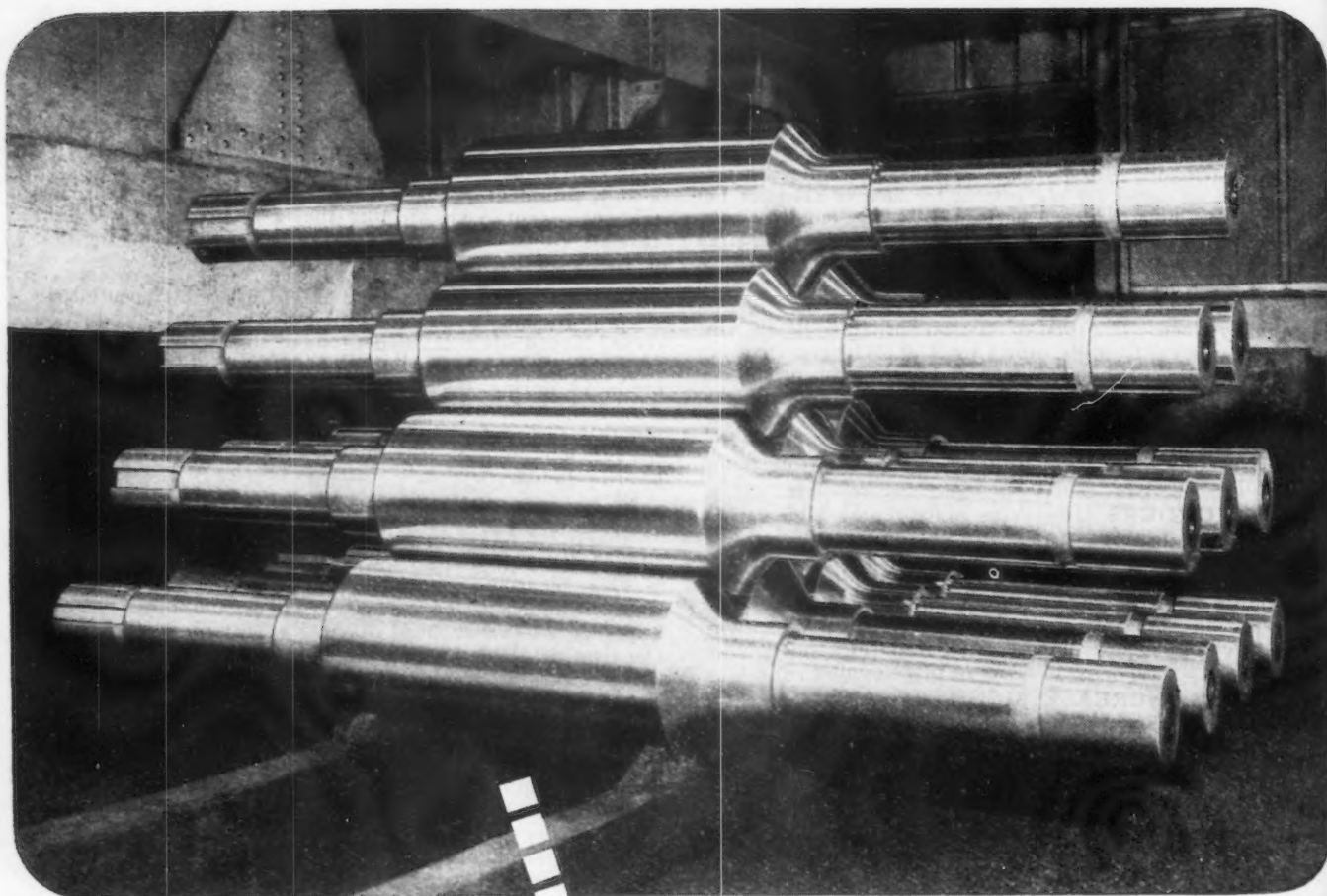
• **RUSSIANS LEARN CONTROLS**—Seven Russian engineers completed on Nov. 15 a six-day course in the handling of combustion controls at the Hagan Corp., Pittsburgh. They spend most of the time at the Hagan plant at Orville, Ohio, where details in the construction, maintenance and operation of these control units were explained. New oil refineries being constructed in Russia under the direction of American engineers and through the American Government have such controls in their boiler equipment.



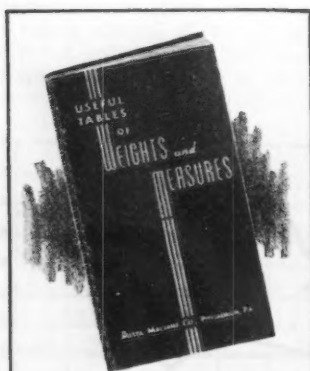
Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	S. Lou's	East	Aggregate
November 21...	94.0	88.0*	93.0	96.5	99.0	90.0*	92.0	91.0	100.5*	87.5	91.0	92.5	94.5	92.0*
November 28...	93.0	101.5	93.0	96.5	99.5	90.0	92.0	93.0	97.5	90.5	93.0	92.5	94.5	94.5

* Revised



MESTA Forged Hardened Steel Working ROLLS

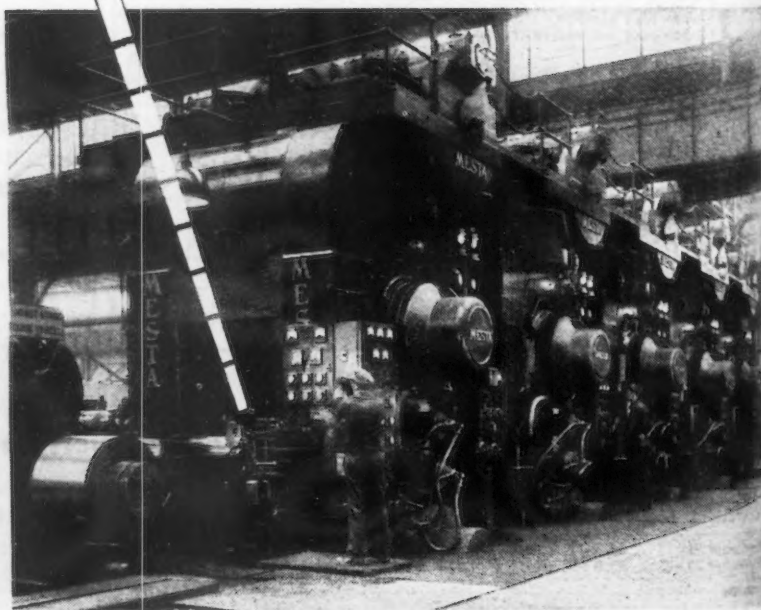


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Wage Decision Grants Indirect Increase to Labor

Washington

• • • Leaving the question of CIO's demand for a 17c. an hr. increase to the President, the War Labor Board decision of Nov. 25 in the steel wage case granted USWA four important concessions which are expected to govern future decisions by the board affecting all industry.

Steel companies (86) employing about 400,000 workers must pay an estimated 7c. an hr. increase, according to WLB, through adjustment of intraplant inequities, increased pay for afternoon and graveyard shifts, liberalized vacations and dismissal pay. All of the foregoing increases with the exception of dismissal pay were made retroactive to last December and January when most of the contracts expired.

While the decision will provide extensive benefits for some workers, and slight adjustments for others, the board agreed with the companies' contentions with respect to the guaranteed annual wage (a special commission will study), elimination of geographical differentials, group insurance, sick leave, learners' pay and the veterans' fund issues.

The order provides for premium pay of 4c. for the first night shift and 6c. for the second. A ceiling of 5c. an hr. for each company has been placed as the limit for the adjustment of inequities.

Labor members dissented against the section of the order dealing with inequalities, and setting up criteria to be followed in collective bargaining. Labor members objected to the 5c. an hr. ceiling, and further objected to the fact that the section prohibits across the board increases. Some board officials interpreted public members' and industry members' uniting on this point to be a stinging rebuke to CIO's tendency, they say, to bargain with the government rather than the companies.

Industry members voted against: (1) Dismissal pay because they considered it a national question, and beyond the jurisdiction of the board to order; (2) maintenance of union membership based upon "alleged responsibility of the Union and its no strike pledge" because "the record is conclusive as to the willingness of the union to strike to enforce its demands, even in time of war"; (3) against shift differentials because op-

.. by DONALD BROWNE ..

o o o

erations are continuous, premium pay has never been customary, and "will disrupt wage relationships" where seniority governs the right to work on day shifts.

On the question of costs, WLB Chairman William H. Davis said that the awards would amount more nearly to 5c. than 10c. an hr. increase. Other WLB officials said that about 7c. an hr. increase is right. The cost to the steel industry, with 400,000 employees on a 44.4 hr. week would be about \$74,000,000 annually on this basis, considering vacation pay, inequalities and shift premium grants.

Retroactive provisions will require an immediate payment of almost this much, it is said. These payments which are to be made in lump sums under WLB suggestion and are expected to range from one week's vacation pay to several hundred dollars.

Officials estimate that authority to adjust intra-plant inequities will be worth about 2½c. an hr. to workers on the average. This will mean no adjustment in companies where inequities have been eliminated.

Based on WLB's estimate of 400,000 employees affected in the steel industry, one estimate is that 27 per cent, or 108,000 workers, is on a fixed

day shift, and will not receive any shift premium pay. Another 7 per cent, or 28,000, are on the fixed afternoon shifts and will be entitled to the 4c. premium, it is said. The remaining 66 per cent of the workers, or 264,000 men, are working on rotating shifts and so while working the three shifts will get an average increase of 3 1/3c. an hr. The entire shift premium will thus cost about another 2½c. an hr. to the industry.

Increased vacations, one week after one year's employment, and two weeks after five years' instead of one week after three years', and two weeks after 15 years' service, were said by board members to be worth an additional 2c. an hr. when paid in cash instead of time-off.

On the question of inequalities, the board denied the union's request for "equal pay for similar work throughout the industry" as a guiding principle. The board said that "the phrase has been so variously interpreted by the parties that it would not be a useful guide." Also, the board stated, if this phrase were interpreted to mean industry wide equalization of all wage rates, it would be contrary to the "hold-the-line" executive order and its supplementary directive.

The board said that it would appoint a commission to decide inequity questions whenever the union and the companies fail to agree in collective

WLB Wage Case Highlights

WLB GRANTED:

1. Adjustment of wage inequities to be submitted to collective bargaining under strict rules. The Board imposed a 5c. an hr. ceiling increase per company.
2. Shift premium pay of 4c. to 6c. an hr. to about 300,000 workers. About 100,000 will not get anything.
3. Liberalized vacations, one week, one year—two weeks, five years of service.
4. Dismissal pay to be arrived at by collective bargaining.
5. Check-off and union maintenance and a dues boost to \$1.50 monthly, initiation fee of \$3.00.
6. Holidays.

DENIED

1. General wage adjustment (17c. an hr. increase) but referred question to the President.
2. Guaranteed annual wage, but suggested creation of a commission to study.
3. Group insurance and said if parties agree WLB will approve.
4. Veterans' Fund.
5. Increase in learner's pay, but said could be made subject of collective bargaining under procedure laid down.
6. Elimination of geographical differentials, but said could be made subject of collective bargaining.
7. Rate establishment and adjustment, referred parties to existing grievance machinery under contracts.

bargaining. The board may review commission findings.

WLB set up the following guideposts to govern the bargaining over job-evaluation:

"1. The extent of wage adjustments required to eliminate intra-plant wage rate inequities will vary between the companies. From the record, it appears that little or no increase to eliminate intra-plant inequities will be needed in some plants where wage rates are now in sound relationship. The largest increases in payroll costs may be expected where little or nothing has been done in the past to correct wage-rate inequities.

"2. The maximum increase for any one company shall not exceed an amount equivalent to an average of 5c. an hr. for all its employees covered by this Directive Order.

"3. The wage rate adjustments which may be made are to be solely for the purpose of eliminating intra-plant wage rate inequities. They cannot be general across-the-board increases and any such general increases will be disapproved.

"4. As an aid to determining the correct rate relationship between the jobs in the particular plant, the company and the union may take into account the wage rate relationships existing in comparable plants in the industry. The contention that wage-rate relationships in other plants in the industry has no significance for this purpose is rejected.

"5. The reduction of an out-of-line rate shall not be effective to reduce the wages of present incumbents." WLB says this does not mean the pay for comparable jobs shall be adjusted to the highest wage rate in an area but the contrary. The highest paid job might suffer a wage reduction in future hiring. The decision orders the companies and the union to negotiate the elimination of existing intra-plant wage rate inequities and reduction in the number of job classifications in accordance with the following steps:

"(1) Describe simply and concisely the content of each job.

"(2) Place the jobs in their proper relationships.

"(3) Reduce the job classifications to the smallest practical number by grouping those jobs having substantially equivalent content."

Union officials told THE IRON AGE that they plan to start collective bargaining within the next week with the United States Steel Corp. over these inequalities, to "get the big companies out of the way first so that a pattern can be set which the whole

industry will follow." Establishment of rates for mechanical and maintenance occupations are to follow the foregoing collective bargaining procedure.

Although the board refused to eliminate geographical wage differentials union officials feel that the board's statement that the denial is not to be construed to affect the correction of intra-plant wage rates under the collective bargaining procedure, and say that they hope "to put the United States Steel Corp. 17½c. an hr. North-South differential" into issue the first thing.

The board also told the parties to enter into collective bargaining on the question of dismissal pay. The union demand was four weeks' pay for one year of service, and eight weeks' pay for three years' service.

Bargaining must go on during the next 60 days and under the order dismissal wages must be paid whenever a plant is permanently closed down. If the parties cannot agree, WLB will decide.

WLB again erected guideposts which if followed will take the advantage of the dismissal award away from USWA, some officials hold. The criteria are:

1. Shutdown of old plants replaced by more efficient new ones.
2. Particular regard should be given to the regular working forces rather than employees who have entered the industry for temporary war service only.
3. Ordinary technological displacements incident to peacetime improvements in machinery and processes were not covered in the presentation of the case, and the order does not cover such displacements.

4. Seniority should govern and older employees should be entitled to larger severance pay, with a limit of payment to workers of a certain seniority.

5. Agreements should include provisions relating to eligibility of employees, the transfer of employees to other suitable employment, the relation to existing pension and retirement plans.

6. Bargaining is to be on a company or plant basis.

The Board also ordered incorporated in future contracts the provisions of Executive Order 9240 which provides for six holidays annually instead of one as formerly obtained. Employees required to work on holidays are to be paid time-and-a-half, but holidays are to be considered days worked, whether worked or not. Time-and-a-half is to be paid for worked performed on the sixth and seventh consecutive days of the regularly scheduled work week. The order is not to be applied to alter existing practice already approved by the Secretary of Labor.

A uniform check-off and maintenance of membership clause was approved by the order, and the Board authorized USWA to increase monthly dues to \$1.50, and initiation fees to \$3.00.

Steel Men Speak on Wage Decision

Washington

• • • The WLB steel decision was greeted by steel executives with the announcement that it increases the need for price relief to off-set increases in costs resulting from the wage boosts. The decision was made effective only on certification by OPA that a price increase is not required, or upon approval by Economic Stabilizer Vinson, if a price increase is required.

While WLB Chairman William H. Davis said that the decision did not even bend the little steel formula, John A. Stephens, vice-president of the United States Steel Corp., and former chairman of the Steel Research Committee which presented the industry's case to the board, said that the shift premium is in disregard of the formula.

Mr. Stephens said that the WLB

action represents a series of wage increases. He declared: "Under the guise of increased vacation pay, adjustment for alleged wage inequalities and other subterfuges the Board has directed an increase in pay to large numbers of steel workers."

Irving S. Olds, chairman of the board of directors of U. S. Steel, described the decision as a further evidence of "a definite trend in government policy which operates to deny a fair return on their money to stockholders who represent a large segment of our population."

Mr. Stephens added: "One hopeful aspect of the board's action is its refusal to recommend an outright change in the Little Steel formula, but the board apparently overlooks the fact that 'hidden ball' tricks pile up as big a score as do direct 'line' plunges."

Continued Merchant Marine Strength Urged to Protect America

St. Louis

• • • Economic and military security for postwar America are dependent upon the decision to maintain a strong merchant marine, delegates to the annual meeting of the Mississippi Valley Association were told here on Nov. 27.

"Maintaining the large merchant marine we are destined to have at the end of the war will be a powerful factor in avoiding a postwar depression," declared Charles H. Weaver, manager of the Marine Department of the Westinghouse Electric & Mfg. Co.

"Furthermore, America's 'time-giving defenses'—broad expanses of ocean—no longer can be counted upon to provide a breathing spell while we build up a merchant marine for another global war as they did at the start of World War I and World War II," Mr. Weaver said.

Pointing to the great stake the Central States have as participants in a world economy, whose crops and manufactured articles are, and after the war may continue to be, carried to every continent by our merchant marine, the speaker continued:

"Here in this great Central States area there are hundreds of cities and towns which have products to be disposed of in world trade, and each has

a vital stake in the postwar merchant marine. Some are industrial, some agricultural, but to each the American merchant fleet offers the open door to prosperity and the key to security."

"No longer is any city in the land remote from a seaport," he said. "No state is too far inland to have adequate facilities for transporting its surplus goods to a seaport where our merchant marine can pick it up for delivery to markets throughout the world which are crying for those goods."

Pointing to the history of America's merchant marine which he said was one of glory in wartime only to be followed by peacetime decline to a low rating among other major nations, Mr. Weaver declared:

"After many disappointing starts, suitable legislation and a competent Maritime Commission have again put America on the right track. Now, we have the strongest merchant marine on earth. This time, let's keep it."

Statistics showing that the American merchant marine declined from a high of 11,000,000 tons at the close of World War I to less than 2,500,000 tons in 1937 were presented by Mr. Weaver. These 2,500,000 tons were a small percentage of the 70,000,000 world total at that time. Ships that had been built for 1917-18 wartime

use were allowed to rot at their docks and no concerted building program was attempted until 1937, he asserted.

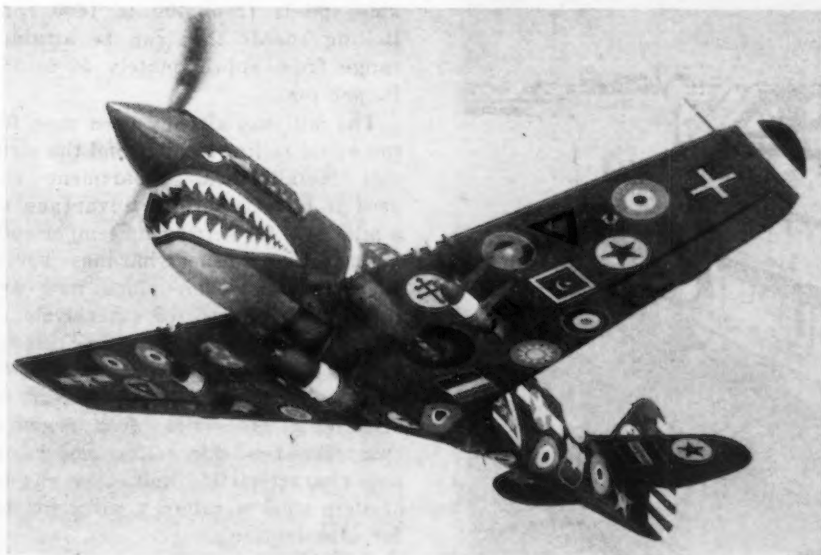
"The year of 1936 was one of great importance to the American merchant marine," the speaker continued. "Congress passed the Merchant Marine Act by a slim majority of eight votes. No one, not even its sponsors, could have dreamed how important that action was, for it gave us a priceless impetus toward the production of ships on which the fate of the democracies hung so precariously in 1942 and 1943."

How the Maritime Commission, formed under this act, operated to allow American merchant ships to compete with those of countries where building costs were less and operating standards lower was explained by the speaker. Financial support was justified, he said, on the grounds that the American standards could not be maintained in peacetime competition with those of such nations as Japan, which paid its able-bodied seamen only \$14 per month.

Among other advantages to be gained from a strong post-war American merchant marine, Mr. Weaver said, are that millions of dollars formerly spent with foreign shipping interests would go to American shippers and be paid to American seamen and that merchant fleets will be essential to the fueling and supplying of the large battle fleets which this country assuredly will maintain.

"Right now is the time to assure that this country is never again relegated to a secondary place on the sea," Mr. Weaver concluded. "To fulfill her destiny America must never be in any but the top spot in maritime power."

NUMBER 15,000: This P-40 Warhawk, emblazoned with the insignia of all the 28 air forces with which the plane has served during World War II, goes through test flight after it rolled off assembly line at the Curtiss-Wright Corp. plant, Buffalo, N. Y., numbering the 15,000th plane to be completed by the company.



Stettinius Named New Secretary of State

Washington

• • • Edward R. Stettinius, Jr., former Chairman of the Board of the United States Steel Corp., rose to outstanding prominence in the Roosevelt Administration on Monday when he was named Secretary of State, succeeding Cordell Hull, who resigned owing to illness.

Mr. Stettinius was elevated from the position of Undersecretary of State and just as in the field of industry in both General Motors and United States Steel Corp., he has served in notable capacities under the Roosevelt Administration.

General Eisenhower Calls For Additional Small Arms Ammunition

Washington

• • • Because of expanding needs of the American Army and allied nations, the small arms ammunition program will have to be doubled in the next four or five months, WPB Chairman J. A. Krug said Nov. 24.

Mr. Krug said it would take time to get back into operation three arsenals which were shut down because of previous cutbacks. The expansion will require an addition of 62,200 workers to the small arms industry alone, he said.

A 221 per cent increase in the labor force of 10 other plants will be required to meet General Eisenhower's needs. General Eisenhower had reported that his men were shooting up their ammunition, chiefly 0.30-caliber rifle and machine gun cartridges, at a rate four times as fast as had been expected.

Labor recruitment to meet the program may be difficult, Mr. Krug conceded. Four of the plants whose production is to be expanded are in Group I labor areas; five are in Group II labor areas, and four are in Group IV areas.

The manpower situation was said to be further complicated by the need

of 15,000 workers by three brass strip plants in Connecticut, Ohio and Illinois.

Mr. Krug said that the following plants would have to sharply increase their labor requirements: St. Louis Ordnance plant, from 14,000 to 31,000; Twin Cities Ordnance plant at Minneapolis, 8200 to 21,000; Des Moines Ordnance plant, 7500 to 16,000; Frankford Arsenal at Philadelphia, 2300 to 4000; Remington Arms at

Bridgeport, 4500 to 6000; Winchester Repeating Arms Co., at New Haven, 1900 to 3000; Western Cartridge Co., East Alton, Ill., 2000 to 4300; Lake City Ordnance plant at Independence, Mo., 9500 to 17,600; two branches of the Utah Ordnance plant at Salt Lake City, from standby condition to 5700.

The following manufacturers of bullet cores are to be expanded to this extent: McQuay-Norris Co., St. Louis, 2600 to 3500; Edison-General Electric Corp., Chicago, 900 to 1700, and the Willys-Overland Co., Toledo, which had been previously shut down, will need 1800 new employees.

Cash Farm Income Expansion Rate In Decline This Year

New York

• • • Farm cash income from marketings and government benefit payments in the first nine months of this year rose to \$14,574,000,000 from \$13,607,000,000 in the corresponding period last year. On the basis of these returns, the prospect is that total farm income for the full year of 1944 will be the largest in history according to the Alexander Hamilton Institute.

The Department of Agriculture

estimates that annual farm cash income from marketings this year will amount to \$19,800,000,000. Government benefit payments should amount to at least \$800,000,000. Total farm income in 1944 will thus amount to \$20,600,000,000 as compared with the previous record high of \$19,764,000,000 in 1943.

The rate of increase this year, however, will have been lower than in the three preceding years of wartime expansion.

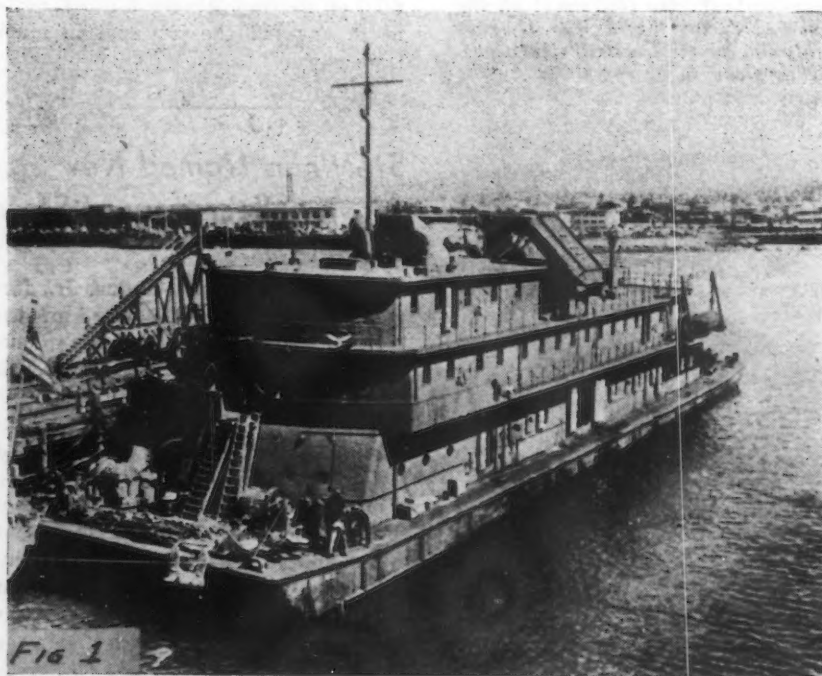
J. & L. Installs Pilot Mill for Strip Research

Pittsburgh

• • • For carrying out further experiments on the cold rolling of strip steel, the Jones & Laughlin Steel Corp. recently installed a pilot two high rolling mill at its Research and Development Laboratory. The mill, purchased from the Standard Machinery Co., Providence, R. I., has 9-in. diameter rolls, 10-in. long, and is powered by a 40 hp. motor with variable speeds from 400 to 1600 rpm. Rolling speeds that can be attained range from approximately 40 to 180 ft. per min.

The mill has already been used for some cold rolling studies and the strip mill metallurgical department has used it to considerable advantage as a pilot mill for setting up temper rolling practices to meet hardness specifications. However, plans now are that it will be utilized extensively in physical research in strip rolling. Studies on the effects of reduction of strip on physical properties, effects of directional properties, deep drawing characteristics, skin rolling and hardness characteristics, and other phases of strip steel metallurgy will come up for examination.

FLOATING POWER HOUSE: Designed by the Army Engineers and built by General Engineering and Dry Dock Co., Alameda, Cal., this mobile floating barge is capable of producing a power block of 6000 kva and can be towed to any desired waterfront area.



Postwar Purchase Orders Permitted but Deliveries Prohibited

Washington

• • • Purchase orders may be placed now for materials to be used in postwar production, but the materials may not be received into a manufacturer's inventory. WPB made this announcement in its Interpretation 11 to Priorities Regulation No. 1, as amended.

Under the provisions of Priorities Regulation No. 1, persons are prohibited from receiving more than a minimum practicable working inventory of materials or products into

stock, WPB officials pointed out. As a result, deliveries of materials for postwar production may not be accepted now and orders for such materials must call for delivery at a future time when the material can be received.

Furthermore, WPB said, if the materials or products are subject to restrictions as to placement or acceptance of orders, purchase orders for them must be conditioned on the removal of the restrictions.

Air Forces' Robomb Declared Improvement Over German Product Dayton, Ohio

• • • Development of a "good" robot bomb that could be used "if we need it" was revealed this week by the Air Technical Service Command at Wright Field, where experts raced to reproduce the Nazi terror weapon in 60 days and send it skimming, jet propelled, through the skies a month later.

Starting last July 4, when Maj. Gen. Bennett E. Meyers told an assembled group of the ablest experts in the aviation industry that the AAF wanted an exact copy of the German buzz bomb V-1, work on the American version was divided up. It was decided that Ford would build the motor, Republic Aircraft Co., the airframe, Ordnance Aircraft Service would supply the war head, Jack & Heintz the complex control system, Monsanto Chemical the launching rocket and Alloy Products the air bottles.

First of a series of problems was to secure a bomb from which a copy could be made and this arrived from England on July 9, accompanied by Lt. Tom Wigglesworth of the ATSC G-2 section, and consisted of sections of unexploded but badly battered bombs. These pieces were hidden in a building at the field and 15 drawing boards were set up.

Analyzing the various metals used in the bomb was assigned to the materiel laboratory, and generally, they found it to be of simple material, low and plain carbon steel, very similar to automobile fender stock, with a

small amount of aluminum in the radiator.

Because the AAF wanted a lot of them and in a hurry, within ten days the first model was in the wind tunnel at Wright Field and a deadline of Oct. 1 had been set for the first flight. Seventeen days after the arrival of the parts the jet engine of the bomb was running. It set up for tests at ATSC's power plant laboratory where an alley was sandbagged off from the rest of the building and a huge piece of steel erected behind the engine to withstand the blast.

Starting the engine provided another problem and experts finally de-

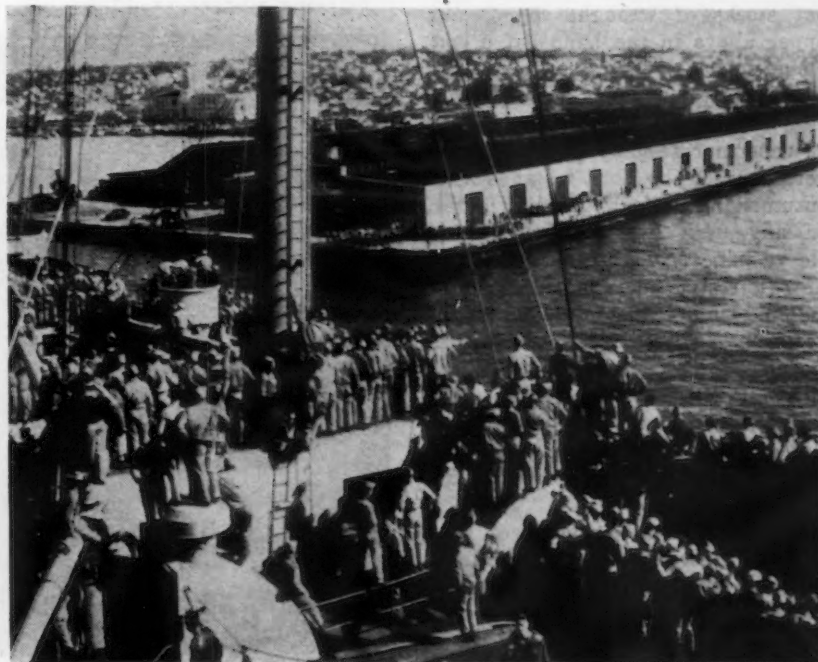
termined that if the bomb stalled at 175 miles per hour and flew at over 300 miles per hour, a terrific blast of air against the radiator was necessary to get the engine going.

A force of 200 lb. per sq. in. was blown against the radiator; it worked. Further, they discovered that the engine would run on ordinary low-cost gasoline.

Later, the control system, an intricate device, was solved. It consisted of air-driven gyros, a pre-set altimeter, a precision compass, and an air log. These set the bomb in the right direction and kept it on its course. The air log, a simple propeller contrivance on the front of the bomb, measured the air miles and at a pre-set distance, armed the warhead, cut the fuel lines to the engine, pointed the bomb downward, locked the elevators, and dropped two unequal spoilers from the elevators to give the bomb a spiral effect in descent.

When the first bomb was released on Oct. 11, a little more than a week behind schedule, improvements had been made. The AAF launching system was less complicated and the ramp could be built in four days instead of the two weeks it took the Germans. Furthermore, the Nazis had used a complex "cannon" running maintain an accuracy of 2 per cent of the full length of the ramp to launch their bombs. The AAF model can also range on a flight of 130 miles.

HOME COMING: Officers and enlisted men of the First Marine Division, veterans of Peleliu, Guadalcanal and New Britain campaigns, crowd every available vantage point aboard their transport to give many of them the first glimpse of their homeland in 31 months.



Canadian Civilian Production To Expand Further by First of Year

Ottawa

• • • Canadian industry will swing into production of civilian goods on a much broader scale and will attain its expanded status at the beginning of the year, according to reports from government sources. Slowing down in a number of branches of the war production program is freeing raw materials for non-war production and already several of the heavy equipment makers now are wholly engaged on production for domestic and foreign civilian needs. Building trades also are again making headway and construction work is proceeding on plants held up owing to the steel shortage that developed several months ago, when Canadian mills were confined to 1000 tons monthly in structural steel output. Many companies now are preparing to go ahead with plant additions and erection of new plants for postwar use and steel buying is developing on an ever increasing scale on this account.

J. G. Godsoe, chairman of Wartime Industries Control Board, announced that surplus materials set aside for war purposes and no longer needed for such purposes, may be used by the manufacturer for civilian production. The revocation of an order of the Wartime Industries Control Board makes possible the release of the materials, and Mr. Godsoe stated the civilian consumer will benefit.

Announcement was made by the Department of Munitions and Supply that stocks of wrought copper and copper alloys in the hands of a consumer, not required within six months, for the original purpose for which they were obtained, may be used by the consumer for any purpose whatever, or may be sold to any other consumer, not a dealer or distributor, for any use. Regulations covering sale of zinc have been modified to allow unrestricted sale and use of zinc and zinc oxide in amounts not exceeding 5000 pounds per month. The new order issued by F. M. Connell, Metals Controller, restricts inventories to amounts not in excess of sales or consumption in the previous two months period. It also calls for monthly reports.

F. M. Connell also announced that the order restricting aluminum and raw materials used in its manufacture have been revoked. An order controlling wrought aluminum and alu-

inum products and orders controlling bauxite and cryolite already have been revoked. Another order which deals with non-ferrous metal ingots, is being amended so that it no longer will apply to aluminum and zinc.

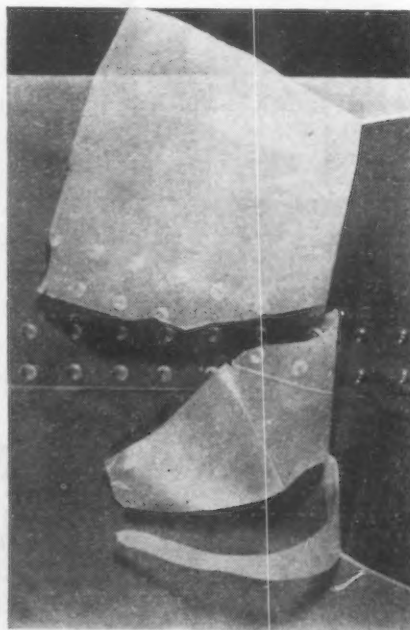
Steel for 375,000 Ice Refrigerators Expected Available

Washington

• • • WPB has announced that enough steel is expected to be available to permit the manufacture of 375,000 domestic ice refrigerators in the fourth quarter of 1944 and the year 1945. Relaxation on the iron and steel content through an amendment made to L-7-c, WPB said, will permit the production of ice refrigerators that approach prewar types.

The order previously limited the iron and carbon steel content to 6 lb. for each refrigerator. It still prohibits the use of stainless steel, monel metal and iconel metal but now permits the use of other types of iron and steel, except galvanized ware, to

PLASTIC COATING: *Airplanes shipped overseas are now packaged with a spray of a plastic solution based on Vinylite resins. The solution, a production of Bakelite Corp., is immune from attacks of temperature, moisture, dirt or grease in its passage to overseas theaters of war, and may be easily stripped on arrival.*



the extent that they are available under the CMP or from idle and excess inventory. Use of galvanized steel is limited to a maximum of 15 lb. for each refrigerator. No restrictions have been placed on the use of aluminum and magnesium.

The provision limiting the net ice capacity for each refrigerator to either 50 lb. or 75 lb. was deleted. Manufacturers who wish to make domestic ice refrigerators are required to apply to WPB for production quotas. Applications should specify the amount of iron and steel and other materials to be used.

WPB will assign quotas for the production of specific quantities of refrigerators during a definite period. Production will be permitted only to the extent that it will not interfere with war production. Use of labor is subject to WMC manpower controls.

British and Dutch Apprehensive Over Rubber Investment

New York

• • • British and Dutch Rubber interests are reported to view the future with some pessimism, according to the Alexander Hamilton Institute. Adding in American synthetics and the accelerated production of natural rubber in South America and Africa, there seems likely to be a total possible world production of 2,750,000 tons a year. Allowing for an increased demand for postwar rubber, particularly for the automotive industry, the highest probable demand is put at 1,600,000 tons a year. This means a potential overproduction of 30 per cent, and one must allow for the development, on top of this, of rubber-like plastics that are almost certain to cut further into the demand for natural rubber.

Together, the British and Dutch have an investment of more than \$1.5 billions in the natural rubber plantations of the Far East. There are an estimated two million Far Eastern workers dependent upon natural rubber for their livelihood. The economic health of the natural rubber industry is part of a wider picture—the economic and political welfare of two nations impoverished by war, Britain and the Netherlands. American exporters need paying customers. These are some of the factors now being considered in conferences between the United States, Great Britain and the Netherlands.

Domestic Transportation Gets 1,254,838 Net Tons of Steel

Washington

• • • The domestic transportation industry has been allotted 1,254,838 net tons of carbon steel for the first quarter of 1945, most of it for railroads. WPB has notified ODT of the allocation, which compares with a requested 1,585,847 tons and exceeds by 215,738 tons the 1944 fourth quarter allotment of 1,039,100 tons. Proportionate amounts of alloy steel, copper and aluminum were authorized, WPB said. In addition to the direct ODT allotment, WPB set aside what it said is an adequate reserve for railroad and local transit maintenance, repair and operating supplies.

For railroad replacement rails ODT was allotted 507,000 tons of carbon steel, which WPB pointed out is the total available capacity less military "must" requirements. ODT had asked for 600,000 tons. The WPB made materials available for the construction of up to a maximum of 2300 box cars for delivery in the second quarter of 1945 contingent upon the placement of orders by the railroads with car builders by Dec. 1, 1944. The ODT is also requesting the railroads to place orders before Jan. 1, 1945, for additional boxcars for delivery in the third quarter, materials for which will be made available in time to complete the program.

The WPB allotted 155,000 tons of carbon steel for automotive replacement parts, for which the ODT had requested 160,000 tons. This is the largest amount provided for this purpose since the start of the war, ODT pointed out. An allotment also was made for the production of light trucks at the rate of 10,000 units a quarter, the first authorization for that purpose since the war began.

The WPB also allotted material for the construction of passenger-train cars, chiefly day coaches, with some baggage, mail and express cars. The materials will be used to construct 105 cars now on schedule and the remainder of ODT's program of 250 such cars per quarter will be started as soon as government authorities approve the manpower requirements, ODT announced.

Carbon steel requirements for locomotives, freight cars, trucks, integral buses, street cars, trolley coaches and truck trailers were met with amounts sufficient to cover production

schedules. ODT requested 20,000 tons for water transport and was allotted 15,000 tons.

Rocket Production At National Tube Co. for U. S. Navy McKeesport, Pa.

• • • Rocket production lines at Christy Park Works of National Tube Company have passed from experimental to full production stage. Rocket motor tubes and "war heads" for the Navy are now in quantity production, made from tubing and seamless pipe.

Not far from the new fragmentation bomb production line and in the same shop where National Tube in 1939 developed the new method of spinning bombs from pipe, men and women are engaged in machining, surface-treating, painting, inspecting and packing motor tubes for the Navy rockets. The tubes are made from seamless cold drawn tubing manufactured at the company's tubular alloy division at Gary, Ind.

SEAMLESS ALLOY steel tubing produced at the Gary plant of Tubular Alloy Steel Division, National Tube Co., forms the basis for the company's participation in the Navy rocket program. Ima Jean Myers holds the lethal cylinders.



In one of the operations, a nozzle-like venturi tube is inserted near the end of the casing. The motive power of the rocket is generated within this motor tube by reaction of burning gases escaping backward, and the venturi controls the release of these gases.

At loading plants, long powder sticks are inserted in the four-foot tubes and electric fuses are attached. Unlike a rifle or an artillery shell, the rocket is a self-propelled projectile. An electrical spark sets off a propelling explosion which blows out a stream of smoke at the rear. When the charge is ignited within the rocket, it generates gases which exert equal pressure in all directions. The forward pressure, having no escape, drives the rocket ahead.

The "war head," which resembles a shell or small bomb, is made at Christy Park from seamless pipe. Officially known as the rocket body, it holds the explosive charge and is attached to the front end of the motor tube.

At the McKeesport plant, the front and back ends of the rocket body are shaped from heated pipe sections under hydraulic pressure followed by finishing operations which include sandblasting, machining, and painting.

The explosive charge is loaded at arsenals to which the "war heads" are shipped direct from McKeesport.

Rockets are used for anti-tank and anti-personnel purposes, as well as for firepower on fighter planes, and as take-off boosters.

Furnace Practice Program Scheduled At EMM Guild Meet

Chicago

• • • Electric furnace practice will be discussed at the third Chicago sectional meeting of the Electric Metal Makers Guild Dec. 9 at the Morrison Hotel, Chicago.

At the morning session, Robert K. Kulp, metallurgical engineer, Electro Metallurgical Sales Corp., will discuss the topic, "Proposed Index for Efficiency of Deoxidization Practice in the Electric Furnace." Panel discussions will be held on both acid and basic electric melting furnace practice. A dinner meeting will follow.

The meeting committee includes A. J. Scheid, chairman, Columbia Tool Steel Co.; Bert Reynolds, Burnside Steel Foundry Co., and J. R. Eisaman, Carnegie-Illinois Steel Corp.

Wide-Scale Reverses Limit

Supplies of Raw Materials for Germany

Washington

••• Wide-scale reverses at the hands of the Allied Nations have taken from Germany almost all outside sources of alloy metals and left the Reich primarily dependent upon its reserve stocks of ferro-alloys for the manufacture of new war supplies, and some of these are steadily declining. This means, according to an analysis by the special areas branch of FEA, that when these stocks are used up, Germany will not be able to replace munitions she then had on hand or in process after they have been used up in the fighting. It was pointed out that these alloys are essential to the production of steel for machine tools, projectile cores and other vital war needs.

In terms of individual ferro-alloys the German position as shown by the analysis is approximately as follows:

Manganese—The loss of Nikopol, the Balkans and Hungary reduced the German annual supply of about 350,000 tons of metal content available in 1943 to a maximum present yearly rate of approximately 70,000 tons. This amount would be sufficient for an annual output of about 7,000,000 tons of steel, as compared with the German production of 35,000,000 tons in 1943.

Chrome—The stoppage of Turkish deliveries and the virtual loss of all Balkan supplies has deprived Germany of practically all sources of chrome.

Tungsten—Under the agreements with Spain and Portugal made in the summer of 1944 a small trickle of tungsten was allowed to reach Germany. The liberation of France has cut off further deliveries.

Nickel—The loss of Petsamo in Finland and the liberation of Greece leave Germany with an annual domestic output of about 1000 tons, equivalent to little more than 10 per cent of her supplies in 1943.

Molybdenum—The loss of Finland and the Balkans deprived Germany of two-thirds of her always limited supply, which amounted to approximate-

ly 650 tons in 1943. The principal source left to Germany is Norway, whose production is now estimated at some 200 tons a year.

Cobalt—Of the 250 tons available to Germany in 1943, Finland delivered 150 tons. Germany is now left with a domestic output of about 100 tons.

Vanadium—Germany produced about 1000 tons of this metal in 1943. Almost the entire amount was produced from the Lorraine iron ores, which are now unavailable to Germany.

Army Air Force Plan For Surplus Disposal Making Solid Headway

Chicago

••• Developments which indicated that the surplus disposal program of the Army Air Forces was making a somewhat slow, but probably solid, start were described at a meeting of interested parties here last week.

Upwards of 100 were in attendance, including Army and Navy people; officials of the Metals Reserve Co., which is administering the program; Murray Cook, who is in direct charge; and warehouse distributors. Progress reports were heard and decisions made on current problems.

Thus far 78 warehouse agents to act for Metals Reserve Co. have already been signed up, of which 25 have already made sales. A total of more than 47,000,000 lb. of steel in surplus inventories has already been reported, valued at \$22,500,000. Out of this, 21,000,000 lb. valued at \$10,000,000 has been sold, and over \$1,000,000 has actually been billed out on invoice to date. In addition, it

developed that around \$4,500,000 worth of material originally reported

An outline of the so-called "Peterka Plan" for disposal of surplus aircraft material appeared in THE IRON AGE of June 8, 1944, page 97.

as surplus was deleted from lists furnished by companies after it was found, on checking, that some had been erroneously included as surplus, and some of the balance was found desirable to retain in shuffling of contracts between the time of reporting the surpluses and checkup on them by the MRC agents.

Thus far it appears that some difficulties are developing over inspection. Some of the warehouse agents have purchased surpluses sight unseen, only to find that finish had been scratched, or had been painted its full length for identification. Another bone of complaint was that delays following transmittal of shipping instructions are common, sometimes for as long as two months.

It was determined that it was permissible to sell aircraft steels without extra charges, i.e., at commercial grade prices, without securing special permission first. However, in any such transaction, the steel cannot be resold for aircraft use. This general policy, however, does not yet carry to the extent that grades can be sold as lower priced grades; a question as to whether 321 stainless, now in excess, can be sold at 302 was referred to policy-making quarters for determination.

MRC is absorbing freight on shipments, but on that account does not want to be responsible for large-scale cross-shipping from one end of the country to the other. Warehousemen were urged to use good business discrimination on return of products from remote points such as the west coast, giving particular thought to equalization in cases where the material was vitally needed in the east.

COMING EVENTS

Nov. 27-Dec. 2—National Exposition of Power and Mechanical Engineering, New York.

Nov. 29-Dec. 1—American Society for Testing Materials and American Institute of Mining and Metallurgical Engineers, technical meeting, Philadelphia.

Nov. 30—American Society of Mechanical Engineers, Rubber Plastics Division, New York.

Dec. 1—Steel Warehouse Association, Pittsburgh.

Dec. 4-6—SAE National air cargo meeting, Chicago.

Dec. 6-8—National Association of Manufacturers, 49th Annual Congress of American Industry, New York.

Dec. 10-13—American Society of Refrigerating Engineers, 40th annual meeting, New York.

Jan. 8-12—SAE Annual Meeting, Detroit.

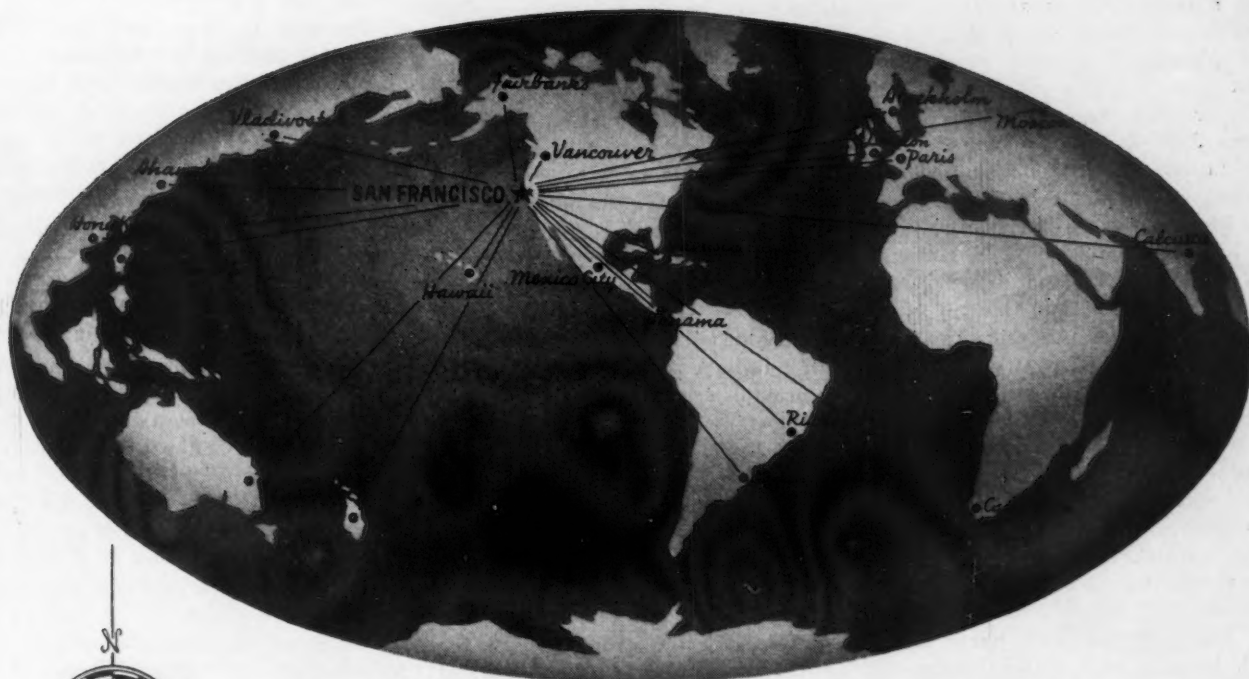
Jan. 10-11—Institute of Scrap Iron & Steel, Inc., annual meeting, Cincinnati.

March 19-22—Machine and Tool Progress Exposition, American Society of Tool Engineers, Cleveland.

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American Can Co. Subsidiary Now In Torpedo Production

New York

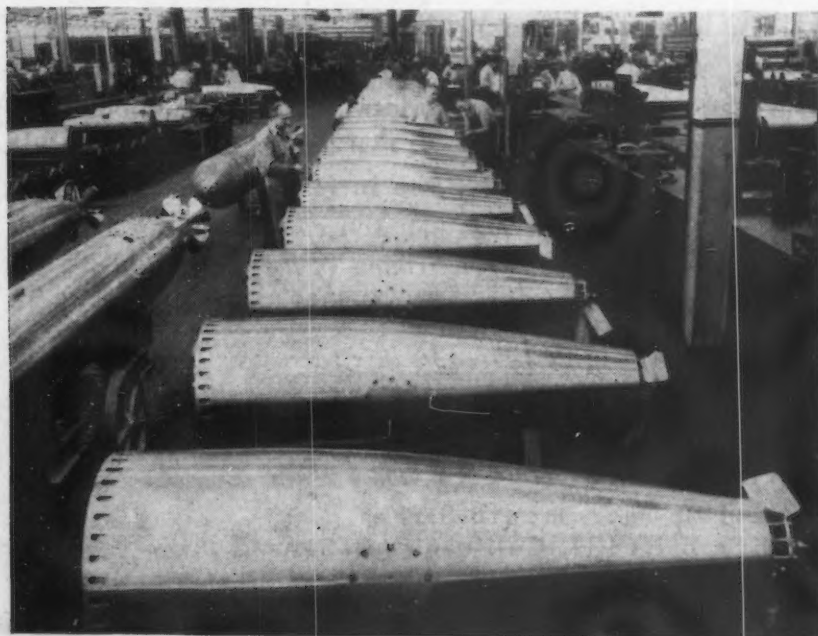
• • • The Mark XV surface craft type naval torpedo is being mass-produced by the American Can Co. subsidiary, Amertorp Corp., which operates torpedo plants at Forest Park, Ill., and at St. Louis, Mo. Prior to this war, the production of torpedoes was always a machine shop operation, but in cooperation with the Navy it has been placed on a mass production basis.

The torpedo measures 23 ft. long, weighs 3000 lb. and is comprised of four integrated sections housed in polished stainless steel. These sections are the warhead containing several hundred pounds of TNT, the air flask, the after-body containing gyroscope and turbines, and the tail cone containing rudders, stabilizers and propellers. Amertorp Corp. is also manufacturing an airborne torpedo weighing a ton.

In working on the torpedo manufacturing problem, 35,000 tool drawings were produced by the American Can Co. drafting staff, and a large part of the machinery, tools, jigs and fixtures required were built in their machine shops. Other manufacturers were also supplied with parts, material, layouts, tool designs, fixtures and other special equipment.

Facilities of the Amertorp Corp.

TORPEDO BODIES: Here are after bodies of the famous Mark 15, surface craft type torpedo, on the assembly line of the American Can Co.'s Amertorp plant in Forest Park, Ill. A large part of the necessary tools, jigs and fixtures was built in the company's own shops.



represent an investment of about \$30 million. Both plants were producing by November, 1942, although contracts were not awarded until January of that year.

Australia Will Place Machinery Orders Now

Winnetka, Ill.

• • • Advance orders for specialized machinery carrying extended delivery dates would be placed immediately under the terms of a 660 million dollar postwar works program for Australia, the Australia News and Information Bureau's most recent monthly report indicates. The program has been approved in principle by the National Works Council, according to the report.

Now under consideration, it is stated, is a plan to unify railroad gages of Australia's 27,000 miles of rail. The disparity between Australian railroad gages has come into particular prominence since the war, and the matter of reconciling them now is before the state premiers, who are responsible for control of the railroads.

A revised shipbuilding program, involving expansion of the Australian industry, also is referred to by the Bureau. Included will be an increase of 400 per cent in construction of 2500-ton freighters, and provision for construction of 550-ton coastal freighters. Work will be continued on 4000 and 9000-ton freighters.

Rustless Steel Corp. Puts New Hammer Shop In First Production

Baltimore

• • • Increased production capacity for war materials now and for peacetime products later are forthcoming from a new half-million dollar hammer shop just completed by the Rustless Iron and Steel Corp. adjacent to its Edison Highway plant here.

The new hammer shop, located on the west side of the highway from the Rustless North and South Plants, was in operation this week with a 12,000-pound air hammer which supplements the work of the rolling mills and makes possible the hot working of the higher alloy stainless steels which are not readily rolled.

Another 5000-pound hammer now located in the Rustless South Plant is to be moved to the new hammer shop.

"Operation of this new hammer shop will speed up deliveries of our stainless steels to contractors for the armed services and will avoid delays formerly caused by having to send this work to out-of-town hammer shops," G. D. Moomaw, vice president in charge of operations of Rustless, declared in commenting on the new production facilities.

"By handling non-rollable grades, by reduction of ingots and bars too large for our rolling mills, and by handling miscellaneous bars which would require too much time to prepare the rolling mills for, our new hammer shop equipment gives us more flexibility in handling war orders and improves delivery on many higher grades of steel."

Russell E. Moran, who has been in charge of hammer operations has been named superintendent of the new shop.

Compressed air operates the hammers and a force of 57,000 pounds is exerted on the piston of the large hammer, delivering a 200 foot-ton blow, with a 25,000 pound force and a 61 foot-ton blow on the smaller. The large hammer has a 94-ton anvil assembly and the smaller a 26-ton anvil.

A dual furnace of 252 square feet of hearth space has been installed to furnish hot ingots and billets for the 12,000 pound hammer, and another with 191 sq. ft. of hearth area has been provided for the 5000 pound hammer. The furnaces are oil-fired and operate up to 2500 degrees Fahrenheit.

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Macwhyte Internal Lubricant improves the sliding action of the wires as they move in bending around sheaves and drums. In many cases the inside wires are in good condition after the outside wires are seriously worn.

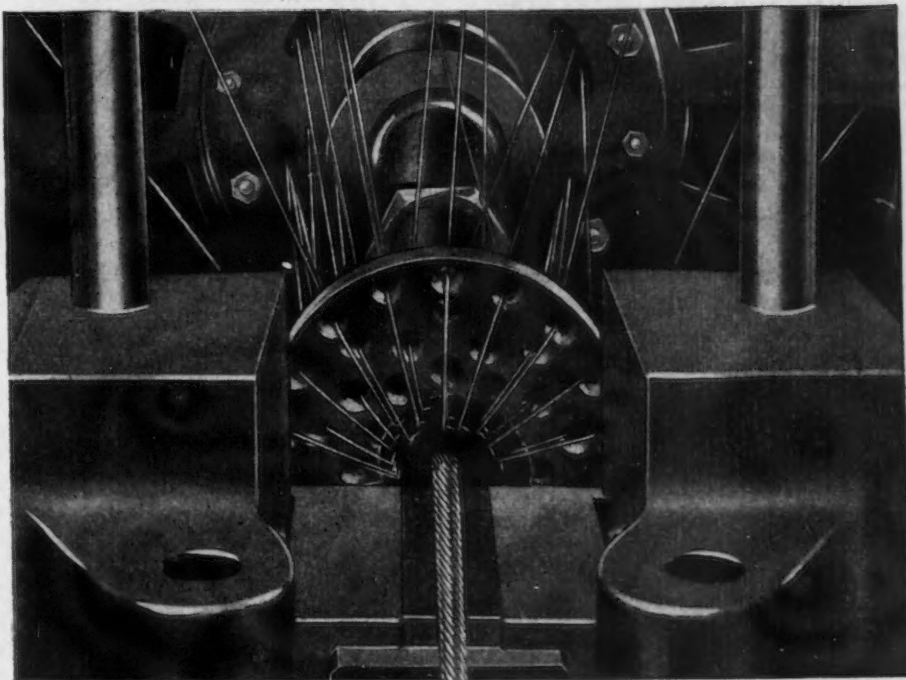
Operators of equipment prefer Macwhyte PREformed Wire Rope because it operates so smoothly and spools on the drum so well.



Macwhyte Wire Rope Lubricant is packed around each wire in all strands of Macwhyte Wire Rope.

If you have a service problem, Macwhyte Wire Rope engineers stand ready to give you the benefit of their experience in selecting the proper size, grade, and construction.

The demands of our armed ser-



vices are so great now, there may be times when we cannot give you our usual prompt service and delivery. The situation changes from day to day so please keep trying to get Macwhyte Wire Rope. We'll serve you if we possibly can.

Rope Conservation Bulletins

18 illustrated articles on the use and care of Wire Rope have been bound into an 8½" x 11" book which is available free to Wire Rope users requesting it on their company letterhead. Ask for Bulletins No. 43-85.

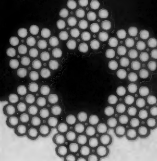
The above illustration shows how Internal Lubrication is applied to Macwhyte PREformed ropes. (Top of stranding die is removed.) Note the wires pass through the lubricant which is pumped up from below and therefore each wire is completely covered and all spaces between the wires in the strand completely filled.

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Founders Meeting Criticizes National War Labor Board Actions

Chicago

• • • Severe criticism of the personnel and policies of the National War Labor Board was voiced by speakers before the 47th annual meeting of the National Founders Assn. here Nov. 16 and 17.

Tracing the history of the NWLB, Gilbert H. Montague, New York attorney, declared, "in the National War Labor Board, as in its predecessor (the national defense mediation board), there are four strongly pro-labor public members and four employer members who are more labor minded than any national organization of employers, so that as selected by the President the National War Labor Board is strongly pro-labor and contains no one contained by any organization of employers and no one in any way affiliated with any employer coming before the board while the labor members of the board are all union officials affiliated with either the American Federation of Labor or the Congress of Industrial Organization, with one or another of which is affiliated every employee coming before the board."

He said that the board has become a "strongly pro-labor pressure agency exerting all the force of the nation at war to induce employers to yield whatever is needed in order to dissuade employees. . . . from instigating strikes or boycotts that may interfere with the war effort."

Montague took particular exception to maintenance of membership clauses ordered by the board, classifying them as instruments of appeasement to organized labor.

"The first step toward a proper government labor policy is to get rid of the government's present labor appeasement complex," he declared.

"When this appeasement complex is deleted from our present government labor policy, American labor will quickly disown any inclination to strangle our American national life and will be willing, like all other Americans, to talk over all questions and disputes, and to arrive at an adjustment on the basis of equal patriotism and mutual forbearance for all Americans."

Clark M. Robertson, general counsel, J. I. Case Co., decried the board's usurpation of authority but saw little chance of a change of policy. He said that its orders were discouraging the process of collective bargaining en-

couraged by the National Labor Relations Act and the Railway Labor Act. "The helpful orders which the unions have been receiving from the War Labor Board are influencing them to become impatient with the ordinary and proper processes of collective bargaining. They are disregarding these processes to the end that their demands may be presented to the War Labor Board knowing that they are more likely to gain their ends through board action than they are through the process of collective bargaining." He urged strong employer resistance to this trend, explaining that it might easily involve a surrender of the functions of management. He warned particularly against so-called mutual consent provisions and compulsory arbitration.

"It is not the function of a collective bargaining agreement to define management's rights or functions," he stated. "When you suggest a clause defining management's rights, you are

POSTWAR HOUSEMAID: *Compactly fitted into a cabinet about the size of the average refrigerator, this electronic housemaid will keep the postwar home free of nearly all the dirt that clings to drapes, walls, furniture and rugs by charging the particles electrically and trapping them on oppositely-charged metal plates.*



bargaining with the union with respect to its inclusion and it is not an appropriate subject of collective bargaining. In suggesting this type of provision you are opening the door for bargaining with respect to managerial functions."

Herman Menck, Harnischfeger Corp., Milwaukee, was elected president of the Association for the 1944-45 term. I. R. Wagner, Electric Steel Castings Co., Indianapolis, was elected vice-president. J. M. Taylor will serve as secretary-treasurer until Jan. 1, 1945, when L. E. Roark will assume the post.

Nickel Alloys in Use Now Have Great Future

New York

• • • Properties of high-nickel alloys, containing more than 50 per cent nickel in combination with other metals, have provided industry with materials applicable to a wide range of uses from the heaviest production units to the wiring of household electric toasters. B. B. Betty of Betty Machine Co., Nashville, Tenn., and W. A. Mudge of International Nickel Co., Inc., New York, said at the annual meeting of the American Society of Mechanical Engineers held here recently.

"These alloys are used extensively for power equipment, petroleum, laundry, food service, household equipment, pickling, roofing and in the paper and pulp industries because of their excellent strength and corrosion-resisting characteristics," the speakers said. "New and improved peacetime uses of the alloys are indicated."

The nickel alloys contain one or more of the metals, copper, chromium, iron and molybdenum, and the non-metallic element, silicon.

During the war years certain of these alloys have found specific important uses in the aircraft industry. One nickel alloy is widely used in aircraft instrument parts which are non-magnetic at very low temperatures, down to minus 70 deg. F.

In another wartime use the alloys are used for aircraft exhaust manifolds because of their heat-resisting properties. Manufacture of metal powders for the new field of powdered metallurgy also finds use for the nickel alloys.

In addition to their heat-resisting characteristics, other alloys combine high strength and corrosion resistance, the latter being of importance in the petroleum industry and in the making of paper and pulp.

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Management's Prerogatives As Defined by WLB Are Compiled

Detroit

• • • On the subject of labor bargaining, there is always some balm in Gilead, and amidst the gloom which decisions of the War Labor Board usually cast over management, there are a few rays of sunshine. Many functions of management have been recognized by the WLB, including some in agreements which have been amended in favor of industry after acquiescence to labor in previous bargaining. Important decisions of this sort have been compiled by Lee Henson, secretary to the industry members of the Michigan Regional WLB. These functions derived from case decisions reported in the War Labor Reports, Volume 1 through 18 (Book 2).

One decision, for instance, provides that the company may discharge plant protection employees for proper cause including violation of working rules, and can assign employees to shifts, beats, patrols and stations in accordance with requirements of providing continuous and effective protection of the plant. Management function includes the right to discharge, but any discharge is subject to the grievance procedure. Similarly, it is the right of management to hire.

Management has the right to schedule hours of work where the contract terms do not limit employers' rights to change hours of work. The union, according to another decision, is not entitled to provision in a contract which requires that changes in hours of work be made only by agreement between the company and the union, although the company must post notices of any changes before they become effective. Similarly, a company is entitled to make necessary changes in the work week and in starting time, although the company should confer with the union before changing the work week, to determine mutually satisfactory modifications.

In spite of a union contention that physical examinations may be used to discriminate against prospective employees, one case upheld the right of a company to continue such practice. The parties were directed to negotiate a plan which would remove any possibility of discrimination.

In filling vacancies and making promotions, seniority shall prevail only where qualifications are equal, one decision stated in recognizing that promotion is basically a function of man-

agement. Another decision denied the union's request for joint participation in determination of merit increases and promotions. Under prior management, interestingly enough, the company involved had already agreed to such joint wage review.

One company was authorized, as regards its operations for the Army under a military contract, to determine rules on production standards, methods, processes, practices and procedures, despite the union contention that it should have a voice in such determinations.

One company was upheld in its disciplining of a union member, despite a union charge that the action was too harsh and was based on the employee's union activities. The decision stated that even though the penalty may have been too severe, the

OUTDOOR SPOTWELDING: *A stainless steel part is attached to the PBM Mariner exhaust system baffle on the flight line at Glenn L. Martin Co., Baltimore, with a special hydraulically operated portable spot welder assembled by engineers from standard equipment. Despite the difficulties involved, welds produced were of production quality.*



company was within its rights because a violation of the rules had been clearly established. Another company was authorized to discipline and impose penalties other than fines or deduction of labor costs where spoilage was caused by employee's carelessness.

In another matter a union request for a contract clause prohibiting management from contracting out work unless all employees are working a full week of at least 40 hr. was denied. This denial came despite a union claim that in the past companies doing similar work in the area had evaded provisions and wage rate scales of union contracts by subcontracting part of the work.

One case determined that the union is not entitled to be a party to the setting of piece rates of a company. However, any new piece rate or modification which after two weeks' trial is unsatisfactory to the employees involved may be taken up as a grievance under the grievance procedure. Another request for joint determination by the union and the company of new piece rates was denied, since the fixing of such rates is considered a normal prerogative of management. Similarly, in another case, the union request for joint participation and determination of merit increases was turned down as an invasion of managerial prerogatives.

In one case the qualification of management alone to determine the competency of employees was upheld. This determination, it was pointed out in another matter, makes it possible for management to let a probationary employee out after a trial period without supplying proof of incompetency.

In another case the restoration of the seniority of an employee who quit his job, but returned when he was unable to obtain a certificate of availability from the U. S. Employment Service, was said to be insufficient reason by itself for entitling him to promotion, since the company is the sole judge of worker competence and can make its decision on that basis.

Army Cancels Bridge Units

Chicago

• • • Indicative of periodic cancellations as the tempo of the war changes or new conditions arise, the War Department has cancelled 634 of the last 1226 Bailey Unit Bridges ordered for 1945. On the other hand the shell steel program, which had been cut back was increased in December.

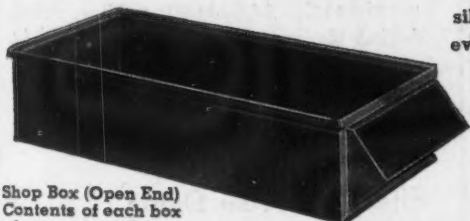
**"A Place for Everything—
and Everything in its Place!"**

with the

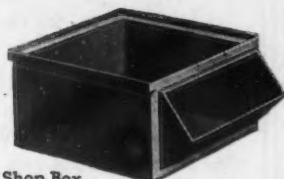
TURNER SYSTEM OF MATERIALS HANDLING



Shop Box
(with Pressed
Steel Handles)



Shop Box (Open End)
Contents of each box
always accessible



Shop Box
(Open End)

These ruggedly built Boxes put your shop in order—and keep it that way. They are part of the complete series of Shop Boxes which function in harmony with other units of the Turner System. They are ideal for storage and transportation. Small parts are easily accessible. Sizes and styles to meet every need.

Sturdy Stacking Units of the Turner System

All Turner Shop Boxes have wide, double-thick stacking edges and reinforced corners. They cannot telescope when stacked high. Turner Boxes are built to fit on the Turner Transport and take their place as part of the complete Turner System of Materials Handling which speeds production, cuts costs, reduces accidents, saves time, labor and space. This system is described in a twenty-page book which will be sent without charge if you will request it on your letterhead.

**Send for your copy
of the Turner Book**



Shop Box
(Small)



Shop Box
(with Drop Handles)



Shop Box
Section (for stacking
on Wheeling Shop Box)



Wheeling Shop Box



Shop
Box
Jimmy



Wheeling Shop Box stacked with Boxes

Wheeling Shop Box stacked with Shop Box Sections

FACTORY SERVICE COMPANY

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Industrial Briefs . . .

• **TWO NEW FIRMS**—The Houk Machine Co., Barberton, Ohio, has been organized and incorporated with a capital of \$50,000. Harold L. Eckroat represents the firm. Also Continental Alloy Castings Co., Cleveland, has been organized and incorporated with a capital of \$25,000, to engage in the manufacturing and distribution of castings and kindred products. A. H. Ganger represents the firm.

• **NEW WAREHOUSES**—A. Milne & Co. announces the opening of two new warehouses—one in Pittsburgh at 1000 Constance St., N. S.; and the other in Philadelphia at 337-339 N. Oriana St. Both will carry a stock of high speed, alloy and carbon tool steels; hollow, solid and auger drill steels; timken graphite steels and stressproof steels.

• **MERGING**—Merger of Western Cartridge Co. and Olin Corp., both of East Alton, Ill., will result from an agreement announced recently. The unification will affect 12 affiliates, subsidiaries and divisions of the two companies. Olin Corp. operates an aluminum reduction plant at Tacoma, Wash., and is the parent concern of the Winchester Repeating Arms Co., New Haven, Conn.

• **MOVES OFFICES**—Chicago offices of Continental Can Co. will be moved Dec. 31 from the Conway Building to the Field Building, which will be headquarters for a new central division office.

• **RE-ELECTED**—At the annual meeting of the Engineers Council for Professional Development held recently in New York, Everett S. Lee, engineer in charge of General Electric's general engineering laboratory at Schenectady, was re-elected chairman of the council for 1945.

• **CHANGES SET-UP**—Mixing Equipment Co., Inc., Rochester, N. Y., has appointed the Emerson Scheuring Tank & Mfg. Co., Indianapolis, representative for central Indiana; and the White

Industrial Sales & Equipment Co., Cincinnati, representative for the company in southern Ohio, northern Kentucky and the western part of West Virginia.

• **ACQUISITION**—Devenco, Inc., New York, has announced the acquisition of additional engineering department facilities at 73 Warren Street, New York, in order to meet its expanding requirements.

• **POSTWAR POTENTIAL**—Gearing of the electrical manufacturing industry to the high production rate attained during wartime when output went to vital military and war-essential uses "is a highly realizable post-war potential," A. H. Feibel, president of the Kelly-Koett Mfg. Co., Covington, Ky., expressed recently.

• **STARTS OPERATIONS**—New brass rod mill of the Titan Metal Mfg. Co., Bellefonte, Pa., is now in operation. The mill, which will double former production of brass rods, was built in record time and financed by DPC as a part of a \$1,500,000 expansion program.

• **NEW LOCATION**—DeVilbiss Co. has announced the removal of its Cincinnati district sales headquarters to 410 American Building.

• **SUBSIDIARY**—A new industrial research and development organization, the Pyrene Development Corp., Newark, N. J., has been formed as a subsidiary of the Pyrene Mfg. Co., also of Newark.

• **DEMONSTRATION**—The versatility of cathode-ray oscillography in industry as well as in research and study, will be demonstrated at the Hotel Kimball, Springfield, Mass., Dec. 7-8, by Consolidated Engineers, Inc.

• **ENLARGING**—Kennametal, Inc., Latrobe, Pa., has announced the removal of their Detroit branch to larger offices at 5531 Woodward Avenue.

Plant Output High For Synthetic Rubber Akron, Ohio

• • • "Rubber Rancho Grande," the giant government synthetic rubber plant at Port Neches, Tex., operated by The B. F. Goodrich Co., produced 100,000,000 lb. of man-made rubber up to Nov. 5, it has been announced by company officials.

The large copolymer plant, which began producing synthetic rubber in August 1943, operated a record total of 1,000,000 man-hours without a lost time accident for any member of its personnel, according to the company's statement.

The output of "Rancho Grande" in slightly more than 14 months is equivalent to the rubber yield of approximately 14,000,000 rubber trees during the same period of time, it was stated.

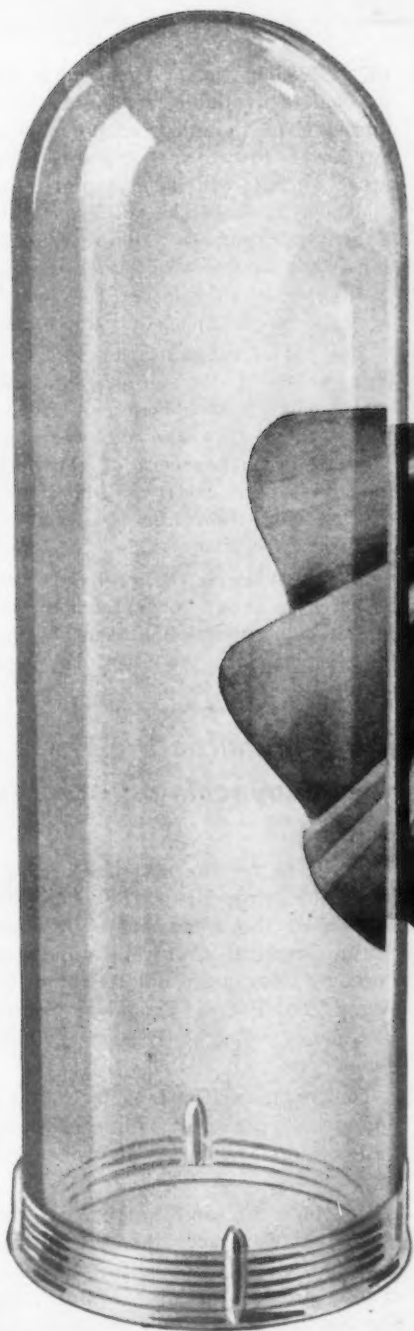
B. F. Goodrich also operates government synthetic plants in Louisville, Ky., and Borger, Tex.

Effect of Grain Shape On Synthetic Sand

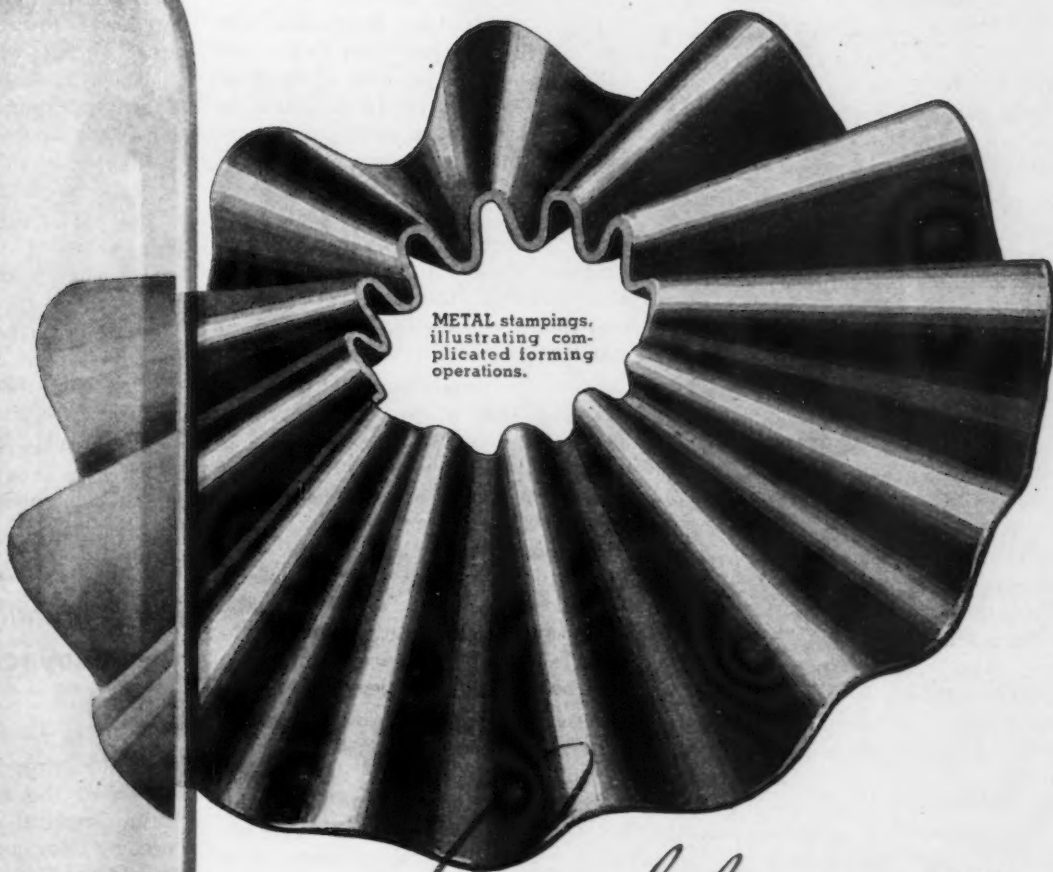
(CONTINUED FROM PAGE 57)

In sands having comparable mechanical gradings, the green and dry strengths of mixtures prepared with angular sand is lower than that of mixtures based on rounded sands. This difference might at first sight be attributed to the greater specific surface of the angular sand, but they are due basically to grain shape. The thickness of the bond on the angular grains is less than that on the rounded grains, and if the proportion of bond in the angular sand mix is increased in proportion to the difference in specific surface the strength is increased but is still much lower than that of the corresponding rounded sand mix. Surface friability after baking is also greater for an angular sand than for one composed of rounded grains, and increases with increasing coefficient of angularity. These differences are attributed to the poorer packing properties of the angular sands and to differences in the grain relationships in angular and rounded sands.

The effect of the grain shape on the molding properties may be reduced in several ways. If the number of flat-to-flat contacts is increased by making the grading less uniform, the cross-sectional area of the contacts is increased and the strength properties are thereby improved. Changing the type and proportion of the bond will also improve strength properties and reduce the bulk density gradient as well.



PLEXIGLASS, injection moulded up to 18 oz. capacity. Illustrated, 12" height — 3 1/2" dia. — 1/4" wall. Internal threading.



METAL stampings, illustrating complicated forming operations.

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BRANCH PLANT — SOUTH L ST., RICHMOND, IND.
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Railroad Replacements Hold Key to France's Industrial Comeback

New York

• • • The comeback in France's industrial activity depends entirely on how soon her disrupted transportation system can be restored. Furthermore, the use of the presently repaired roads must be in the hands of the Allied military forces until such time as Germany is defeated.

According to M. Ernest Mercier, head of the French Mission in this country and France's chief utility official, the situation may be relieved some now that the Allies have taken the Port of Antwerp which is much closer to the battleline than Normandy Beach. This means, he said, that supplies can come to the armies through the Antwerp Port which may relieve the transportation line from Normandy to Paris and other points which have been used exclusively for military supplies.

Assuming that Germany is crushed within the next three months, M. Mercier said that it would take at least six to nine months before the transportation lines with inter-connections were rehabilitated to the point where a real semblance of industrial output could be maintained. This will require at least 2000 locomotives, thousands of freight cars,

and at least 3000 trucks to be used to repair highways which have been greatly damaged, he said.

Coal mine output in France now due to the transportation factor and others is only 15 per cent of the total needs of the country. In the next few weeks it may go up to 20 per cent as miners who have been working no more than three days a week will go to four days a week. The coal situation is the crux of steel output as well as other industrial activity. It was also said that the tons per man of coal mined is somewhat below prewar standards.

From the steel standpoint M. Mercier said that at present steel production is about at a standstill. It will remain that way until sufficient coal can be moved to the steel making areas. About 60 per cent of France's steel capacity is in the Lorraine Area where the fighting is heavy and it is not known to what extent damage may have been done. Damage to other steel making areas, he said, have been of little consequence.

Before the war France had an abundance of ore (and still has) but lacked coal. Ore was usually exchanged with Belgium and Germany in return for coal. France's coal output for metallurgical purposes was able to support no more than 65 per cent of the country's steel output.

Prewar steel output was about 7,000,000 tons a year with a capacity

of 12,000,000 tons. Until such time as coal is available, steel output will suffer. Even though French coal finally moves to prewar amounts, total steel output will be no more than 4,500,000 tons. The difference between this tonnage and the 7,000,000 tons that represents practical capacity depends on whether coal can be brought in from outside the country.

The job of rehabilitation in France is immense, M. Mercier said, and estimated that it would take all of ten years to restore the damage done. More than 25 per cent of the buildings have been destroyed and the job of restoring the ruined harbors will require some time.

Power in Paris, he said, has been restored to about 75 per cent of normal as some means has been obtained to get coal into the Capitol's power plants.

Plans Manufacture Of Launching Propellant

Dayton

• • • Plans for the manufacture of a launching propellant for American models of the robot bomb by Monsanto Chemical Co. were announced here by Monsanto officials and the Army Air Forces Technical Service Command, Wright Field, Dayton, Ohio.

The company statement followed announcements that Monsanto was building an \$8,000,000 plant at Karnack, Texas.

Development and testing of the propellant were accomplished through cooperation of Monsanto, the National Defense Research Council, and the Air Technical Service Command. Dr. Charles Allen Thomas, head of Monsanto's central research laboratories at Dayton, had a leading role in directing the research.

Struthers Furnace Banked

Youngstown, Ohio

• • • Struthers Iron & Steel Co. has banked its furnace at Struthers and according to W. C. Holzwarth, president, there are no indications when production will be resumed.

Only merchant stock in the valley, the Struthers furnace was banked, Nov. 14, Mr. Holzwarth said, "because we can't product iron at OPA prices and because there is little demand, as large steel companies are able to produce enough iron to meet their own needs."



STEEL BALL-
LOONS: These
stainless steel oxy-
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Firestone Steel
Products plant, Ak-
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first ever develop-
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More Forgings Per Sinking with the New BARIUM DIE STEEL

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India Looks to U. S. For Steel Expansion Material and Machines

New York

• • • The United States and its businessmen have a champion in the Indian industrial groups who are looking to this country to supply them with the machine tools and other materials necessary for large scale industrialization of India, provided prices are competitive with other countries.

Not only do these men from India want American tools and equipment, but they want foremost the production methods used in this country. Especially are they interested in this phase when talking about the Bombay Plan for large-scale steel expansion which was tabled by the war and by the crisis for home rule.

India now has a steel capacity of close to 2,000,000 tons a year, a substantial amount for a country of that size and makeup. According to Indian representatives, steel capacity before the war was 1,000,000 tons a year. The increase in the past few years, while not large in tonnage, represents according to India's businessmen a tremendous step-up for that country in so short a time.

Before the war all of India's steel capacity was for plain carbon steels,

but since the war it has been making alloy and acid steels. A large part of the completed steel expansion is said to be utilized for those special steels. Practically all of the steel India produces now is for war purposes with only about 10 per cent going for essential civilian needs.

India's pig iron capacity likewise has expanded since the war started. Before then capacity for iron was about 1,500,000 tons most of which was processed into steel with about 500,000 tons left for export. Before the war, exports were mainly to Great Britain and Japan. Exports to the latter country were stopped when the war broke out. At the present time India's pig iron capacity is about 1,750,000 tons.

The major steel company, privately owned, in India is the Tata Steel Co., which accounts for about 80 per cent of the present capacity. The other company which makes up the remaining 20 per cent is the Bengal Steel Corp., formed about three years ago. Expansion is expected to take place at that plant when conditions warrant.

Practically all of India's steel expansion is expected to be for home consumption. According to representatives from that country, new steel in the postwar period will be used in the expansion of India's entire industrial system.

The so-called Bombay Plan on steel construction which was made public

earlier this year and on which nothing has been done but planning because of the war, calls for an addition of from five to seven million tons of steel capacity. According to advices obtained by THE IRON AGE a few weeks ago, Indian industrialists are certain that the steel expansion program will eventually go through. It is to this country that India is looking for the materials, equipment and techniques for carrying through this tremendous expansion. First and foremost in the minds of India's steel men is the desire to use the "American production methods." Unless other factors interfere, machine tools, steel equipment and other materials will come from the United States.

Copper Production Reaches New High

Washington

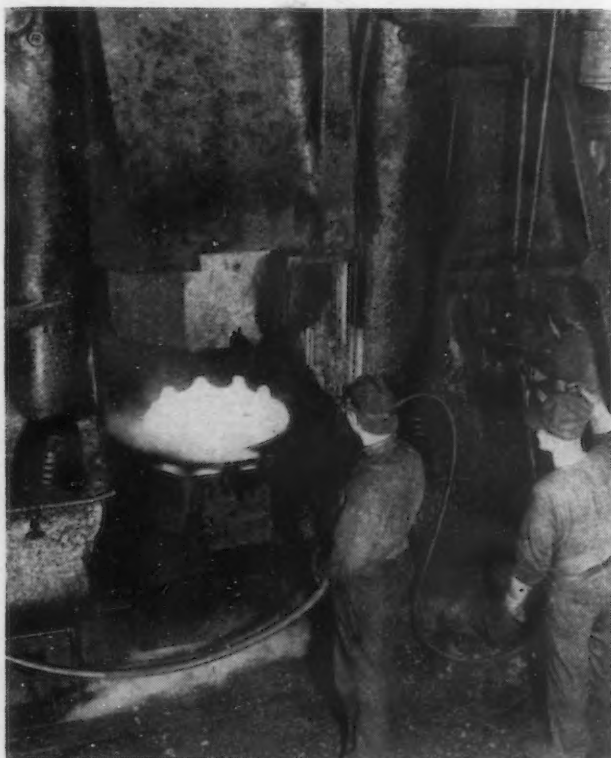
• • • Production of copper products and alloy tubing reached an all-time high in October, it was disclosed at a recent meeting of the WPB Brass Mill Industry Advisory Committee. Brass mills in October produced 35,000,000 lb. of copper products and 30,000,000 lb. of alloy tubing, both record figures. On the other hand, the October output of 91,000,000 lb. of rods was described by WPB officials as "very good." Strip production, however, was "slightly off" with the output measuring 233,000,000 lb. This was attributed to a downward adjustment of some ammunition programs. WPB officials said that November forecasts indicate that production during this month will compare favorably with the October figures.

Ford Plans Open House

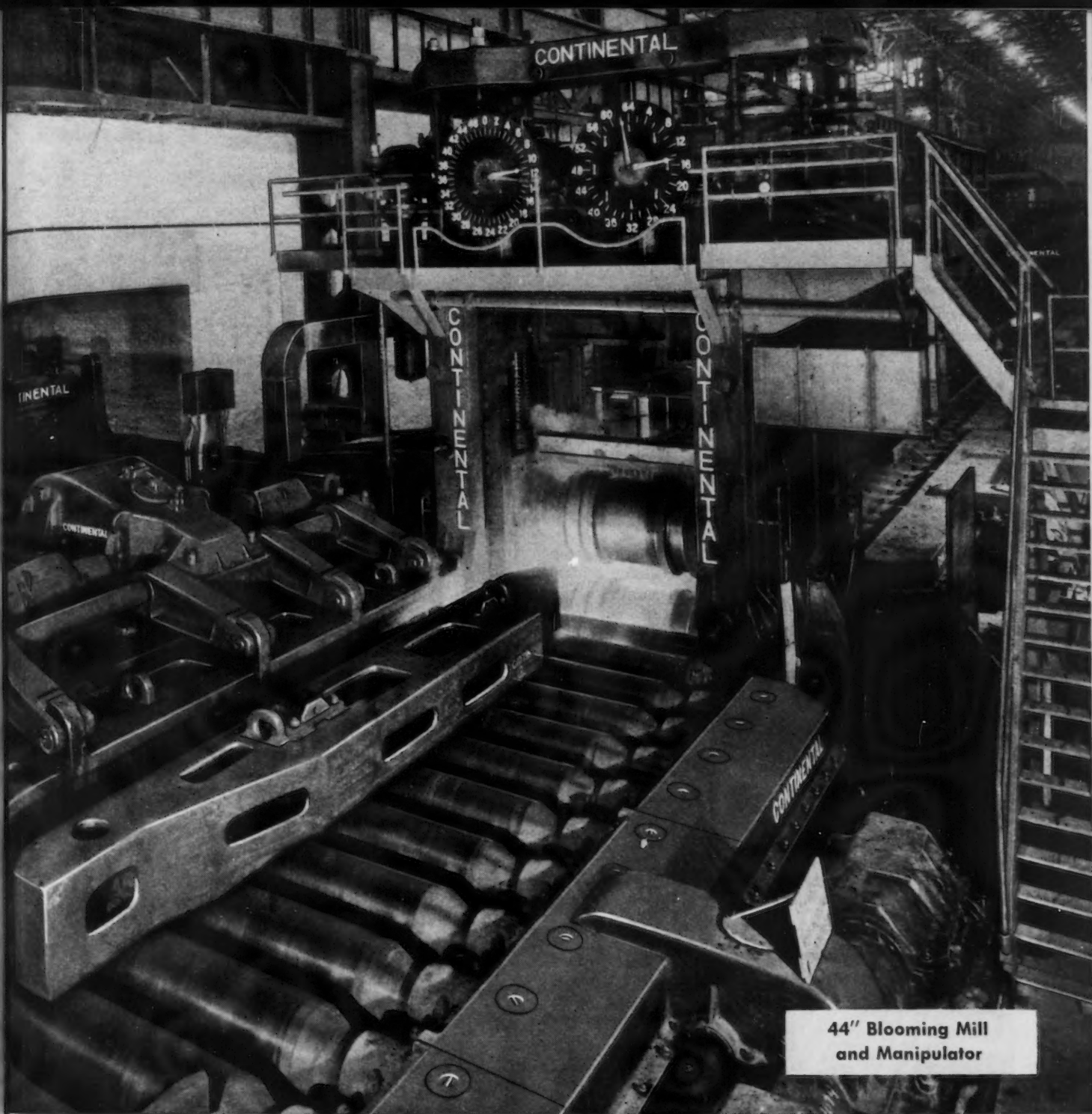
Detroit

• • • The last two Sundays in November and the first two in December have been designated as open house days at the Willow Run bomber plant operated by the Ford Motor Co. Citizens of nearby communities, including Detroit, have been invited to go through the plant, marking the first time that any big war plant in this area has been thrown open for general inspection.

Ford Motor Co., in making the announcement of the open house days, proved that it is thinking in terms of aggressive merchandising when it specified that tickets for admission must be obtained at Ford, Mercury or Lincoln dealerships. Brisk demand was reported.



FORGED CRANK-CASE: Steel crank-case sections for Wright 18 cylinder 2200 hp. aircraft engines are forged in the huge Dodge plant in Chicago.



44" Blooming Mill
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CONTINENTAL FOUNDRY & MACHINE COMPANY

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(FORMERLY CONTINENTAL ROLL & STEEL FOUNDRY COMPANY)

Canada Promises Jobs And Fair Income To All Willing Workers

Toronto

• • • C. D. Howe, Minister of Munitions and Supply, has announced that the new Canadian department of reconstruction will find jobs and fair income for all those willing and able to work. Mr. Howe stated:

"Such statistics as I have been able to gather indicate that the achievement of our objective will demand 1,000,000 jobs more than were to be had at the outbreak of war. I do not regard 1,000,000 jobs as an impossible objective. Much has happened since 1939 which makes for new and useful employment. Canada has expanded greatly in that period—in industrial activity, in farm production, in mining and in lumbering. New factories and industrial plants have been built to a value in excess of \$1,300,000,000.

"We have manufactured, or brought into Canada, machine tools to the value of \$140,000,000. That new capacity and those new tools must be kept in use to provide new jobs.

"We all know that certain war plants, for example, shell-filling plants and explosive plants, must go out of business. We know that other plants must close for a time to permit conversion to new

lines of production. Even now, the closing of a war plant seems to cause consternation, even though those employed in the plant are well aware that the type of work they are doing has no place in a peacetime economy. You who are leaders of organized labor can help by explaining the necessity to the workers and in helping the transfer of the workers to other employment. Where the closing of a plant is for the purpose of retooling, you can help by holding the workers for the necessary period where peacetime construction can begin.

"During the war period the government has been the principal buyer of the output of our factories. That being the case, the government has built and operated, either directly or through crown companies, or management fee contracts, a substantial part of our industrial capacity. I like to think that the government can operate plants successfully providing it has an assured market for the product.

"The government cannot compete with private industry in marketing through ordinary trade channels either at home or abroad. Therefore, it must be the objective of the government in the reconstruction period to dispose of government-owned war plants, which cost some \$900,000,000, to private industry, except for such plants as can be advantageously operated by the government to fill a na-

tion-wide want, such as the synthetic rubber plant at Sarnia."

The minister said the government will dispose of these plants in a manner best calculated to provide new employment for Canadian workers. He said that shortly after the end of the war in Europe he believed there would be many products manufactured in Canada that are now being imported.

"All type of industry talk to me in terms of expansion rather than in terms of curtailment," he stated. "That is another reason why the prospect of finding 1,000,000 new jobs does not seem impossible."

"As a matter of first importance, there must be a comfortable home for every family in Canada," Mr. Howe declared. "That will require some 300,000 new homes. Public works normally carried on from year to year by cities and provinces, such as the building and repair of highways, must be resumed on a scale that will take up the lag caused by war years."

The cities and provinces are in excellent financial position, he said, and can provide required funds. The federal government also has its list of public works required now, but deferred on account of the war.

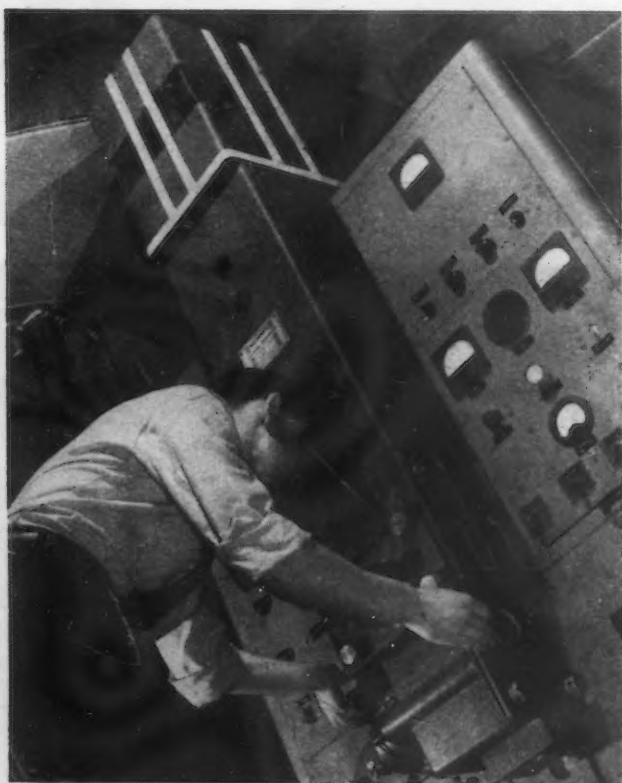
Mr. Howe stated the progress of the war is making it possible for the government to drop many of the controls that have been part of the wartime economy and that each week sees a new list of control orders cancelled.

Cutback in Canada's Aluminum Production

Ottawa

• • • Aluminum production in Canada will be cut by approximately 50 per cent as a result of cancellation of U. S. and British orders. Arthur MacNamara, director of National Selective Service, has stated that the Aluminum Co. of Canada will lay off approximately 2,500 men in five plants in the Arvida district of Quebec by December 10. Many of these will be absorbed by the army or essential war industry. He said that the layoff results from lessened demand for aluminum.

Montreal officials of Aluminum Co. point out that deferment of U. S. and British orders will reduce Canadian aluminum production to less than half the present rate. It is added, however, that company officials do not expect aluminum production to drop, even temporarily, to the pre-war level.



RAY OSCILLO-
GRAPH: This
streamlined version
of the scientific
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sion tool, the cathode
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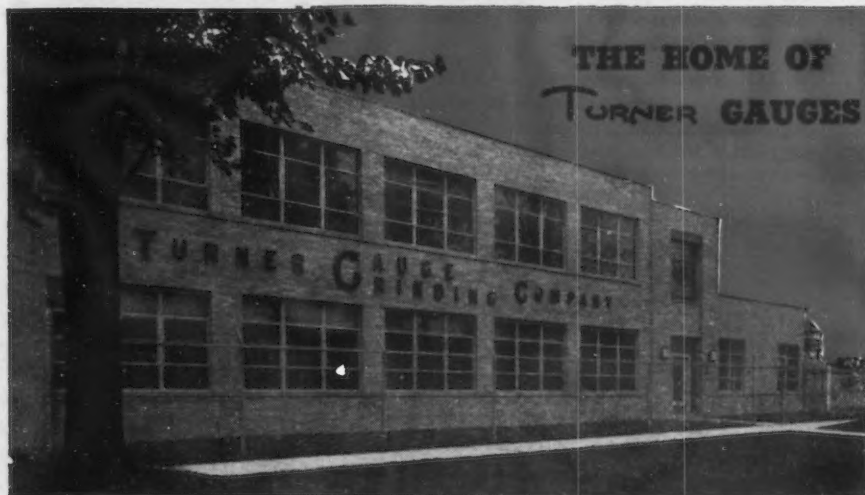
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Precision*



... to inspect the home of **TURNER** gauges

The next time you are in this vicinity we invite you to take a trip through our plant and offices which production experts call ideal for the manufacture of precision equipment. Investigate the well planned working conditions which make the perfection of Turner Gauges possible.

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NEWS OF INDUSTRY

Paper Mill Machinery Orders Seen Reaching \$80 Million a Year

Washington

• • • New business in process or contemplated for the paper mill machinery industry is estimated at a rate of more than \$80,000,000 a year by the WPB Paper Division. The division has approved orders for new paper mill machinery approximating a rate of \$37,000,000 a year, as indicated by the \$9,250,000 in orders approved in the three months since Aug. 15. In addition, the division said, the industry has about \$4,000,000 in orders pending, more than \$20,000,000 in authorizations for mill construction has been made, about \$12,000,000 more is awaiting approval; there is probably \$5,000,000 more in orders for new equipment costing less than \$2,500 and repairs and replacements are estimated at more than \$2,000,000.

WPB said that supplies of materials and components will be the chief problems of the industry after V-E Day. Some difficulty was said to be presently encountered by the industry in obtaining castings as foundries were reported to be extremely short of labor, especially in New England. Continued control of paper mill machinery under L-83 was recommended by the WPB Pulp and Paper Machinery Industry Advisory Committee at a recent meeting. It also recommended the granting of priorities as a means of building up the industry without interfering with wartime production. Discussion of L-83 disclosed that its continuance was not believed necessary for any long period after V-E Day, if materials become available in adequate quantities. It was suggested that the \$2,000 limit on maintenance and repairs and control of transfers of used mill machinery should be eliminated from the order as soon as possible.

Lake Coal Shipments To Total Over 55 Million Tons

Cleveland

• • • W. J. McGarry, manager of the Ore & Coal Exchange, estimates Lake coal shipments for the 1944 season will amount to between 55,000,000 and 56,000,000 net tons. Covering the season through 7 o'clock a. m. Nov. 13, the Exchange's latest figures show 51,852,911 tons of coal, including vessel fuel has been loaded into ships at Lake Erie ports.



TOMORROW'S ENGINE?

BOHN

MECCHANIZED warfare has had a tremendous effect on the development of internal combustion engines. The lessons now being learned will appear in concrete form in the motor car engines in the after-the-war era. One thing that is definitely sure is that new engine designs will furnish greatly increased horsepower per pound of engine weight. Engines will be smaller and by the greater use of aluminum alloys, will be considerably lighter. Bohn—one of the pioneers of light alloy parts for automobile engines—will be in the forefront in aiding these new developments.



BUY
WAR
BONDS

BOHN ALUMINUM AND BRASS CORPORATION • DETROIT 26, MICH.
GENERAL OFFICES—LAFAYETTE BUILDING

Designers and Fabricators—ALUMINUM • MAGNESIUM • BRASS • AIRCRAFT-TYPE BEARINGS

F. W. Dodge Official Urges Self Restraint In Postwar Period

New York

• • • Several factors appear to point to rising construction costs and to a generally higher price level for the postwar period as compared with prewar. Moreover, postwar inflation on the scale obtained in 1919 and 1920 seems unlikely, according to Thomas S. Holden, president, F. W. Dodge Corp., in a study entitled, "What About Postwar Prices?" just published by his organization.

A study of price behavior before, during and after World War I and before and during the present conflict points specifically to three factors brought into play by both wars which spell rising prices after this one.

Mr. Holden defines these factors as follows: First, wartime spending by government has spread purchasing power widely, has increased savings and the volume of money in circulation, and widened the potentialities of credit; second, government debt has increased, and in enormously greater amount this time than in World War I; and third, wartime limitations on civilian construction and on production of civilian goods generally have

built up enormous potential demands.

These three factors came into play during both wars, but there exist today certain differences on the side of curbing inflationary tendencies in the postwar period.

"Price controls," Mr. Holden states, "have been much more effective this time. Business executives and people generally are more keenly aware of the dangers of rapidly rising prices than they were 25 years ago. At various times in recent years they have exercised considerable self-restraint in the face of price inflation threats. The government will probably seek to avoid drastic deflation and widespread unemployment likely to result from it. Statistics on current price trends, current production and inventories will be more widely available and more widely understood than in the years 1919 and 1920.

"The two wars we are fighting this time will not end simultaneously. There will be a partial reconversion to a peacetime economy in the period between V-E Day and V-J Day and gradual, rather than sudden, removal of wartime controls. Government must procure adequate materials to finish the fight against Japan, to support armies of occupation and, possibly, to aid in some measure reconstruction of devastated countries.

"Productivity of American industry and its adaptability to quick shifts in production schedules are much greater than in World War I.

"These differences are on the side of curbing inflationary tendencies in the postwar period. Actual price behavior will depend in large part upon the behavior of the spending public. An early spending spree could run prices up very rapidly.

"Nevertheless, postwar behavior of prices in general, and of construction costs in particular, will be of vital importance to early and sustained revival of construction activity. The situation will call for wise policies and reasonable self-restraint on the part of producers and distributors of materials and equipment and of skilled building labor."

Curtiss-Wright Corp. Denies Intention To Leave Buffalo Area

Buffalo

• • • Rumors that the Curtiss-Wright Corp. would discontinue operations in this city immediately upon termination of the war were emphatically denied by official spokesmen for the company.

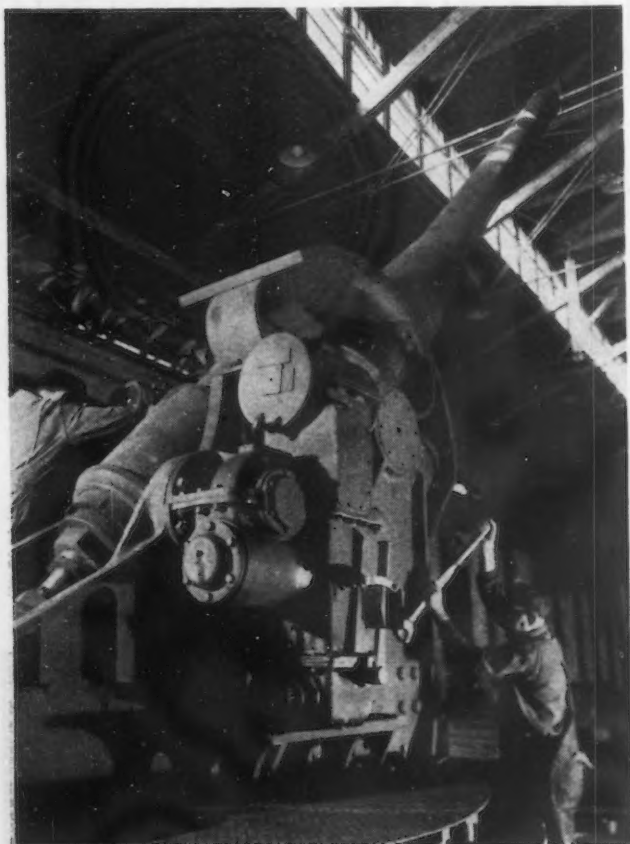
"The report that we are going to abandon our Buffalo plants at the end of the war is absolutely without foundation," declared N. S. Vanderlip, general manager here.

"Even now we are making plans which, for obvious reasons, cannot be divulged at the moment, for postwar operations on a wide scale. We intend to do business here as usual for a long time.

"True, with the ending of construction of warplanes, we shall not continue local operations on such a scale as current demands mandate with three shifts employed, but we certainly do not intend to close up such shops as we have here."

"At the moment," said Adrian W. Smith, assistant to the vice-president, Burdette S. Wright, "we do not anticipate closing down the Buffalo plants. A war has yet to be won and the final victory must be achieved before anything in the industrial world is definitely established on a full peacetime scale.

"Naturally, Curtiss-Wright, along with other plants, is studying plans for peacetime, but nothing has been determined, and we certainly do not plan to shut down our vast facilities in Buffalo."



COSTAL DEFENSE GUN: Many of these 6-in. coastal defense guns will guard the U. S. shoreline now and after the war and will be a practical monument to perpetual vigilance.



*New
Book*
on Tools for
Obtaining
Accurate
Thread Forms
in
Less Time

Remarkable savings are being made in thread grinding through the use of the new Tru-Thread Diamond Tools for dressing thread grinding wheels.

Tru-Thread Diamond Tools employ a radically new principle, applied for the first time by Wheel Trueing engineers, and utilize the hard characteristics of a diamond of a shape never before used for such a purpose.

The results of this new development are reported by users who tell us—for example—that with Tru-Thread Tools they are running three to four times as many pieces as they obtained with their previous tools.

Tru-Thread Tools obtain wheel forms quickly and accurately and leave the wheel grain sharp and free-cutting. Wheels cut clean, hold their form longer and grind more

pieces between dressings. Wheel cost, tool cost, and cost per piece all are reduced accordingly.

These tools, which are made in types for dressing each specific form, are completely described and illustrated in a new booklet which we will be glad to send you on request. If you have thread grinding equipment, this booklet will point the way to substantial savings. Send for your copy.

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Japanese Economy Bulging at Seams After 7 Years' War

New York

•••The attack by American forces on the Marianas islands early this year has been called Japan's "Stalin-grad" by a German newspaper correspondent writing from Tokyo. Early this year, an "austerity" campaign was opened in Japan which can certainly be compared with the German anti-complacency measures after the first serious reverses of the Wehrmacht. The Japanese tea-houses and theatres, as well as all "luxury" shops, have been closed; no railway tickets may be sold for pleasure trips; students are liable to do labor service; the evacuation of children and others who have no business in the big towns is recommended by the authorities.

More significant still is the mobilization of the country's woman power which began only a few months ago. At least 60 per cent of all employees in banks, insurance houses, catering establishments and post offices have to be women or girls; the minimum

quota for the motor, rubber and oil industries is 30 per cent; and for other engineering and shipbuilding establishments 10 per cent. Last year's program for telescoping all unessential industries seems to have been carried through by June this year; and a survey which was published towards the end of 1943 shows that at that time as many as two-thirds of all textile factories had already either been closed or put at the disposal of other factories or industries.

The number of clothing coupons, which were barely sufficient in 1943, have now again been cut by 50 per cent for all persons up to 30 years of age, and by 60 per cent for the older generation, whose members are supposed to have larger pre-war stocks. Clothing habits have already been greatly affected by these new measures. Kimonos are out of fashion as they require too much material; the Japanese girl, 1944 edition, wears a utility suit with trousers.

The industrial strategy of Japan is best illustrated by the list of "key industries" which have first priority with regard to the supply of labor and raw materials; among these are the aircraft industry of all acces-

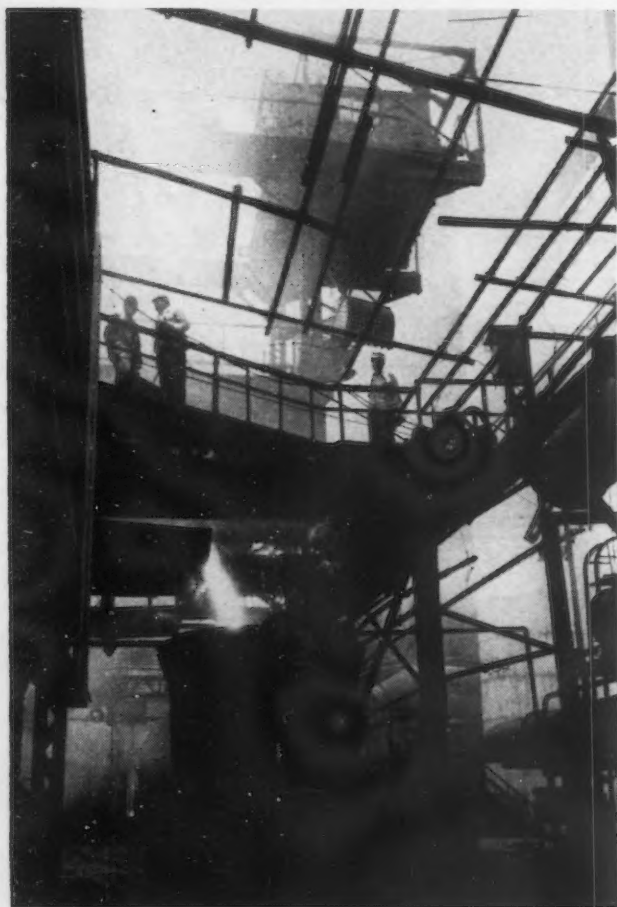
sories and of auxiliary machinery, and those iron and steel, aircraft fuel and lubrication oil, as well as coal mining, munition production and shipbuilding. The first place among "essential" industries was formerly taken by shipbuilding, but, today, aircraft production is by far the most vital industry. The Japanese claimed early this year that the volume of aircraft production had doubled during the preceding twelve months; more recently, a spokesman of the Ministry for Production boasted that the output of aircraft is now larger in Japan than in any other country with the exception of the U. S. A.

Considerable attention is also given to mining activities, particularly in Japan itself and in the Chinese and Manchurian territories near the Japanese islands. Recent production programs provide for an increase of 60 per cent in the output of iron ores, and 30 per cent in the output of copper ores, although some of the new ores will probably be low grade. The mining company of the Mitsui Trust has recently doubled its share capital, largely in order to expand its coal mining.

A new industrial hierarchy is being built up, under the control of the Ministry for Production, itself a fairly new government department, but with the active collaboration of the big industrialists, whose economic and social power is bound to be further increased by these new measures. The general managers or other leading employees of certain big establishments in a number of "key" industries have been nominated as government trustees for production; government orders are given directly to these "trustees," who are responsible not only for the output in their own works, but also for a number of companion factories which are being combined with the big works for the purpose of war production.

Various technical reforms have recently been introduced. It was claimed a few months ago that a simplification and rationalization of the types used in the machine-tool industry had led to savings of raw materials ranging from 30 to 50 per cent, within the preceding six months. Shift work is being introduced in an increasing number of key factories, often against considerable technical obstacles.

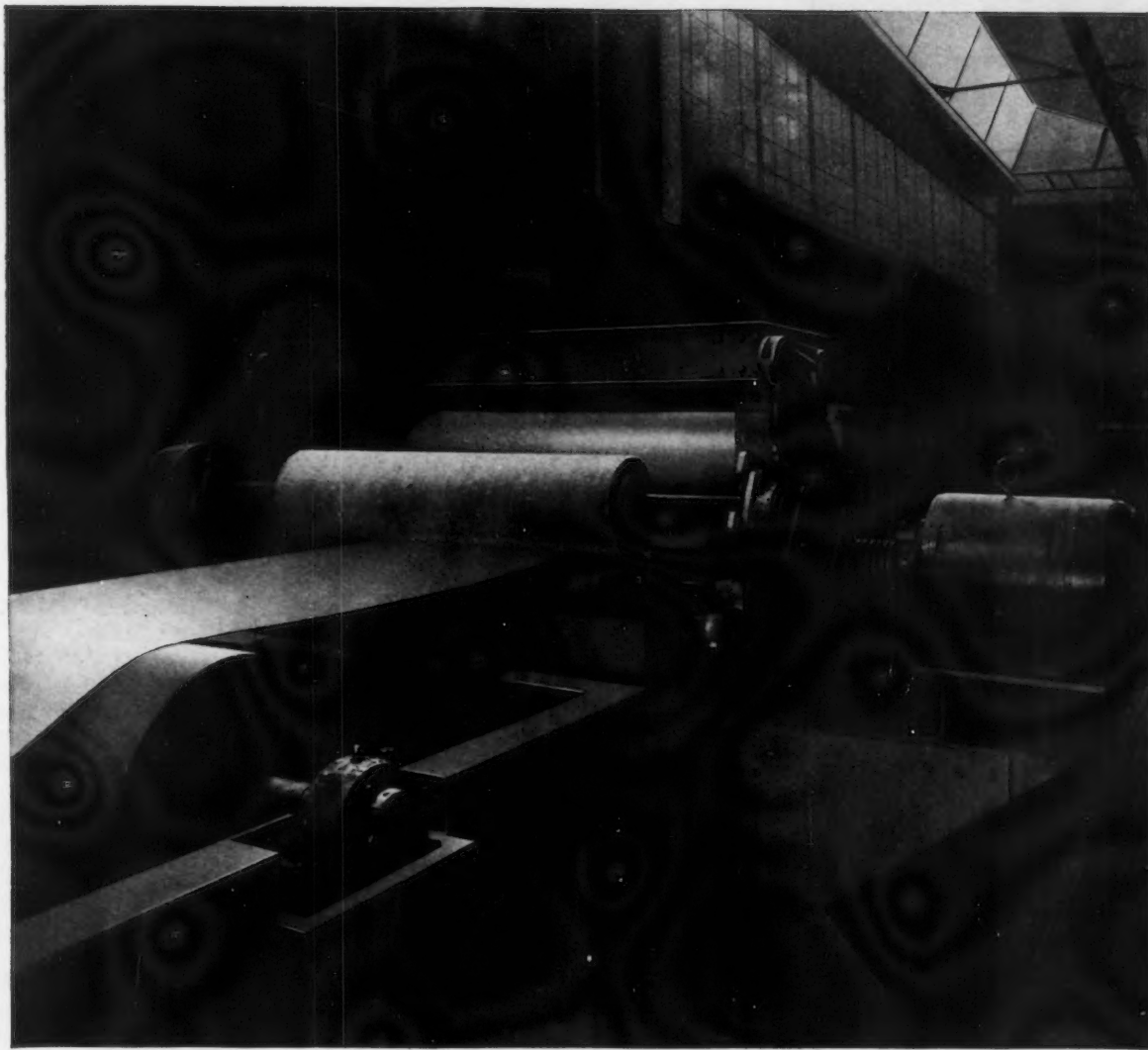
The rigid price-control measures which sometimes acted as a brake on output, even though they could not stop an increase in wholesale prices by some 40 per cent between 1939 and 1943, have now been considerably



• • •
MOLTEN FIRE-
WORKS: *Splashing, dancing forms of fire, the molten pig iron in a Japanese steel mill, is poured into the container to be transported to another part of the plant by means of a railway car.*
• • •

BRUSHES

—a production factor



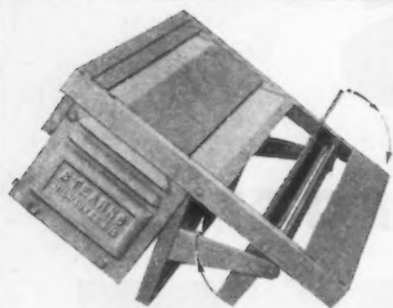
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They provide efficient and powerful, quick acting, near or remote control, low cost protection against tramp iron in your conveying or processing operations.

Our Bulletin 92 contains complete information. Write for it!



**STEARNS MAGNETIC
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635 S. 28th St., Milwaukee 4, Wis.

loosened; the control of prices has been decentralized; the prices of light metals and other essential products have been increased; and, most significant, a system of special premiums has been introduced which are being awarded to industrial establishments for any outstanding successes in production. These new concessions may, of course, further endanger the price-mechanism; and it is perhaps significant that, according to a recent report, the Japanese now also contemplate a general increase in wages.

Price-premiums for special achievements are also among the measures designed to raise the agricultural output, particularly the output of rice and other staple foodstuffs. The Japanese Government has completely stopped the importation of rice, mainly in view of the shortage of shipping space.

Minimum quotas of rice have been fixed for every peasant, for the first

time this year, which have to be delivered to the marketing authorities. In addition, peasants have been urged to cultivate wheat, barley or oats during those months of the year when their rice-fields would otherwise be unused; this year's harvest of grains other than rice has been as high as 27 million koku (one koku equal 4.96 bushels), compared with a harvest goal of 70 million koku of rice; consequently the "rice" ration of the town population now consists of a mixture of rice and other cereals.

Potatoes are also cultivated in larger quantities than before; but otherwise vegetable-growing in the villages is to be discontinued or to be very considerably reduced. The cultivation of green vegetables is stimulated, however, in the form of allotment-gardening by the townspeople themselves, so that valuable peasant labor and transport may be saved for more essential purposes.

Labor Advisor of Old NRA Condemns Present Policies

Detroit

• • • Current national labor policies will seriously and effectively impede the chances of prolonged recovery of business after the war, it was asserted recently before the Economic Club of Detroit by Dr. Leo Wolman, who acted as Chairman of the Labor Advisory Board of the NRA.

Dr. Wolman characterized the present labor policy as "a price policy." Its aim, he said, is to raise the price of labor regardless of circumstances, by holding that wages need not be adjusted to major economic changes such as the passage from war to peace or the existence of a large and permanent volume of unemployment.

"The policy assumes that there is no relation between the state of prosperity of an industry and its wage level," he said. "It disregards the relation between the price of labor, the cost of doing business, and hence, price consumers are expected to pay for the goods and services they wish to buy. The policy holds that when industry is unable to pay the required wages, the rates of pay are to be sustained by Government expenditures, regardless of the state of the budget and the burdens of taxation.

"Our labor policy, in addition to

being a price policy, is a make-work policy. As such it assumes that restricting output increases employment. It argues that industrial efficiency, instead of being promoted and encouraged, should be arrested and regulated. It is the source of the numerous restrictive rules which have had so long a history in the railroad and building industries. Its effects are to obstruct and delay progress in industry, to add to the costs of installing and operating new and better machinery and tools, and to discourage the investment of capital."

Dr. Wolman predicted that these policies will cause the working population of the country to fall into two fairly well defined groups—the employed, favored by high standards and fair employment, and the unemployed, doomed to long spells of idleness and subsistence on Government doles. He asserted that these effects are something "which no responsible American can contemplate with equanimity" and maintained that labor problems and policies must be discussed with greater frankness than heretofore employed.

In describing the attributes of current labor policy, the speaker said that "our labor policy replaces authority with litigation." In place of settlement of minor disputes by the agents of management he pointed out that a semi-judicial procedure is now necessary, one that is wasteful, costly, and inefficient.

Harvey Mudd Elected New AIME President

... Harvey S. Mudd, president and managing director of the Cyprus Mines Corp., Los Angeles, has been elected president of the American Institute of Mining and Metallurgical Engineers for 1945.



Harvey S. Mudd

Donald H. McLaughlin, vice-president and general manager, Cerro de Pasco Copper Corp., New York, and Leo F. Reinartz, manager of the Middletown Division, American Rolling Mill Co., Middletown,

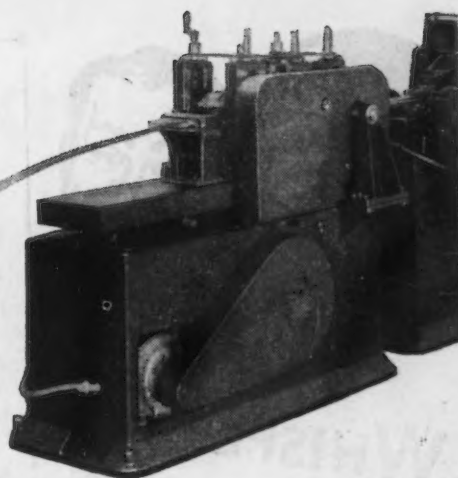
Ohio, have been elected vice-presidents of the Institute.

Six directors also elected were: C. H. Benedict, metallurgical manager, Calumet & Hecla Consolidated Copper Co., Lake Linden, Mich.; Robert H. Morris, general manager, the Gauley Mountain Coal Co., Ansted, W. Va.; J. C. Nicholls, assistant to the president, the International Nickel Co. of Canada, Toronto; Clyde E. Weed, vice-president in charge of mining operations, Anaconda Copper Mining Co., New York; Eugene A. White, manager, Tacoma Smelter, American Smelting & Refining Co., Tacoma, Wash., and William Embry Wrather, director, U. S. Geological Survey, Washington, D. C.

Galvanized Sheet Supply Seems Tight for Next Year

Washington

... WPB has announced that it can offer no assurance that galvanized ware manufacturers will be able to obtain delivery of galvanized sheets to the extent of their current and 1945 quarterly. This fact was brought out at a recent meeting of the Galvanized Ware Manufacturers Advisory Committee when it was reported that requirements for galvanized sheets have reached an all-time high but the manpower shortage does not permit production to be increased accordingly. At the same time, however, some open mill capacity for hot and cold rolled sheets for the first and second quarters was reported.



WHERE FLAT WIRE

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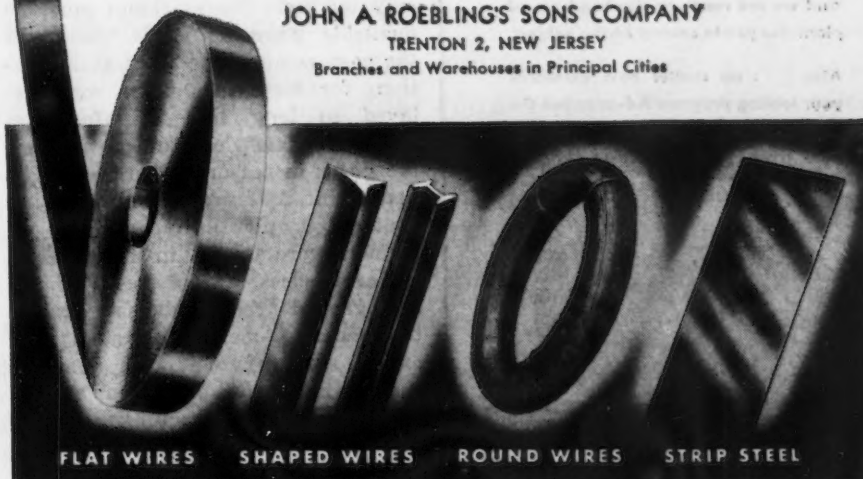
Roebling Flat Wire stands out as a *quota buster* whether you run it through forming rolls, punching, shearing, or drawing! It is dimensionally stable...and steel analysis, temper and finish are so closely controlled you can operate your machines at top speed without fear of "jams" and damaged dies!

Come to the "wire specialists" for Flat, Round or Shaped Wire and Strip Steel... these shop-tested products—built to your specifications—may be the profitable solution to your current production problems—and may make the difference between profit and loss when "cost plus" order taking gives way to tough competitive selling in the postwar world!

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COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS
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Its principal use is for drawing and forming dies . . . body tops, fenders, radiator grills, hoods, lamps . . . refrigerator tops, sides, doors, trays . . . stove parts, tractor parts, farm implement parts, caskets, grave vaults, etc.

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Farmers Still Face Hurdles Before They Get Enough Machines

Chicago

• • • In a rough manner, today's war news serves as an index of tomorrow's farm-supply news. Factors governing next year's available stock of farm equipment tie into what's happening overseas.

As the Allied squeeze approaches and crosses the borders of pre-war Germany, the long-term outlook for available farm equipment brightens, although the immediate effect may be to make a complicated situation more complex.

Because of acute shortage of manpower in farm machinery plants and regulations precluding hiring additional help in certain critical labor areas; shortage of component parts or material needed by the military services, there seems little probability that the industry could effect an immediate increase in farm equipment output even if the War Production Board were to raise manufacturing quotas tomorrow, or eliminate production controls entirely.

It takes time to procure materials. Orders entered now with suppliers cannot be filled for months in some instances. Also, it takes time to produce, after materials are received. Furthermore, as every farmer knows only too well, the machines must be available when he needs them. In the past, some of the WPB authorizations for increased quotas were delayed so long that manufacturers didn't have sufficient time to produce the goods in season. There would be little point, for example, in increasing quotas on planting equipment if farmers were already in the field.

Nevertheless, as our fleets, planes and ground troops advance against the enemy, American farmers may expect some of their own domestic supply lines to strengthen though with more actual effect likely in '46 than '45.

Manufacturers are doing a good job of current production. At the end of their last fiscal year, June 30 (plus a month of grace on a group of special items to August 1), they had reached within a small fraction of the stiff schedule set for complete machines.

A well repaired implement these days, plainly, is almost as good as a new implement. Just as plainly, an implement in hand is better than an implement "on the way," especially if

its season of use is about to begin. Delay, from whatever cause, can endanger or destroy the result of the farmer's every cropping effort.

Familiar with the multiplication of such touch-and-go crises over long years that covered one world war and part of another, the farm equipment industry has striven to maintain the necessary flow of repair parts so that the machines already on farms may continue to function. These parts alone will be a vast factor in the maintenance of adequate farm production in 1945.

Notwithstanding the huge effort, the availability of farm machines completed next year hangs upon the slowness or rapidity of our progress toward victory in this double war that America wages.

Some cutback on production for military use would no doubt follow the conquest of Germany. But if it came tomorrow, few could say how soon farmers could get all the implements they need.

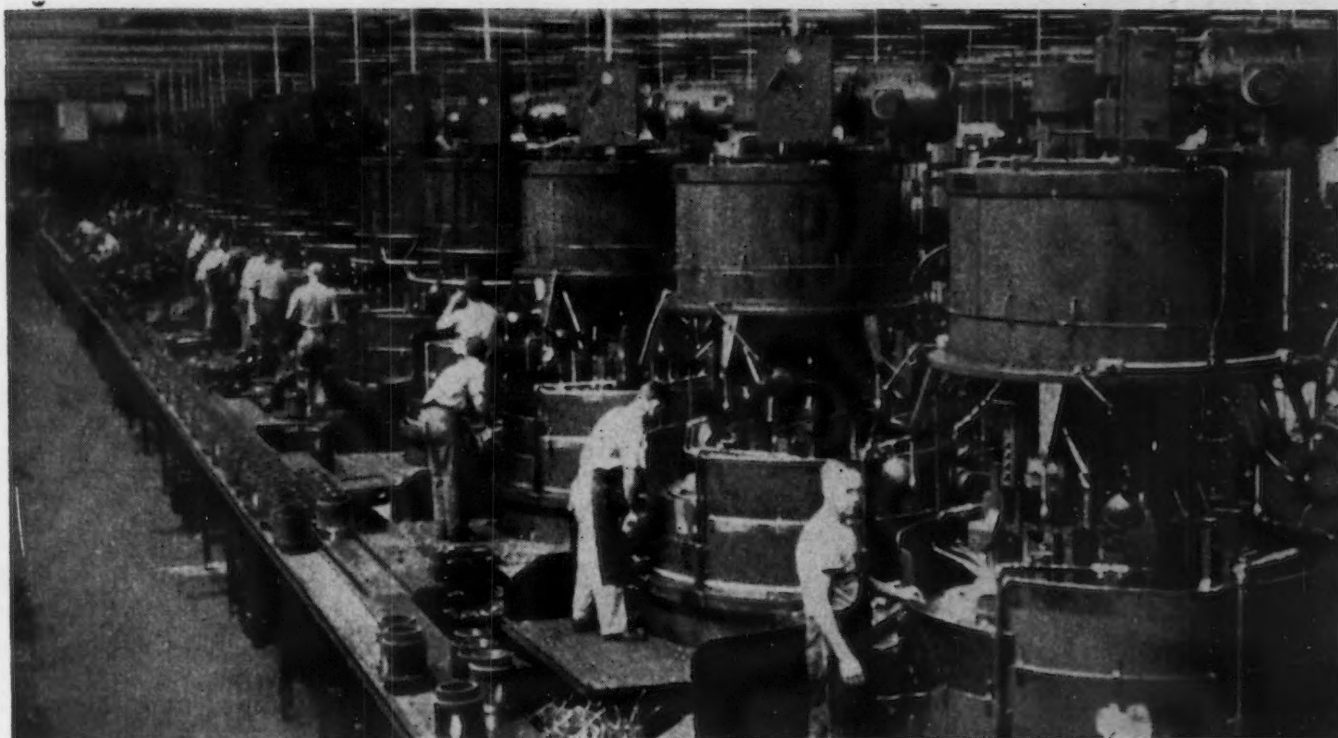
Neither the optimist nor the pessimist is a reliable guide to the state of the farm equipment supply next year. Facts and events as they unfold are to be trusted, only after verification.

For instance, rationing of all farm equipment except corn-pickers was ordered lifted as of midnight, September 27. In effect, that means merely that rationing, or its equivalent, transferred responsibility from the local rationing authorities to the implement dealer. The available quantity of equipment remained the same. It is the dealer who will funnel the supply to the point of greatest need. By disposition and experience he is equipped to do the job with complete competence. The dealer and the farmer in consultation must use their best judgment.

As to the supply for next year, the Office of Materials and Facilities of the War Food Administration, in a recent release, stated that "the overall quantity of new farm machinery and equipment now authorized for production and expected to be available for the 1945 crop season, is approximately the same as has been produced in 1944. This is also about the same quantity as was produced in 1940."

In the meantime, it is wise for the farmer not to rely upon being able to get all the new machinery he may need or desire in 1945. Rather, let him make every preparation which he individually is able to. This will be his best protection.

LUCKY IS HE WHO HAS ONE *friend!*



A BATTERY OF MULT-AU-MATICS IN THE WRIGHT PLANT

There's nothing like having one tried and true friend and the Bullard Mult-au-matic has proved a true friend to the Wright Aero Corporation. In pre-war days Wright knew Mult-au-matic's performance . . its capabilities . . its accuracy. And in war production this battery of Mult-au-matics has continued its high productive output . . keeping pace with war-time needs . . efficiently and at low cost. When peace comes these same Mult-au-matics, easily and simply converted, will be ready to take up peace-time production again. The Bullard Mult-au-matic is one friend you can depend on.

Bullard engineers are ready to assist in your post-war planning and tool change-over.

THE BULLARD COMPANY
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BULLARD

MACHINE TOOLS

... News and Market Activities

Surplus Board Appointments Draw Critical Fire in Tool Centers

Cleveland

... News of the surplus disposal board nominations was not received here with any optimism, and the attitude in some quarters seemed to be that the new board represents the worst in presidential appointments. Universally, the reaction was that none of the men apparently possesses the industrial antecedents prerequisite for the disposal of \$100,000,000 of surplus war property.

Local machine tool men are entertaining the frank hope that Senate approval, now pending, will not be given, and that some changes can still be made with consideration given to the recommendation that each member have five years' experience in industry.

Postwar plans, held in abeyance until the board was named, are still just plans and nothing more, and it was felt that the obviously political make-up of the present board had little chance of understanding the machine tool industry's problems.

One company official, to whom the nominations came as an unpleasant surprise, advanced the view that

whatever the board does will be criticized by the New Dealers as fostering monopoly, since the people buying these tools and equipment will be going companies, and the administration has not always been friendly to going companies.

Public auction of 400 government-owned machine tools in Washington caused little comment here, except among some of the jobbers, who feared that it might be indicative of a government tendency. This was not the case, however, since the machines offered at auction were old, probably 40 years, and perhaps part of the surplus resulting from the effort to bring the government arsenals and Navy yards right up to date.

Emphasis locally is still on the heavy shell machinery program, and the Navy's new rocket program along with small arms ammunition machinery.

Tool Market Unchanged

Cincinnati

... The district machine tools machinery market continues on the same basis as a week ago with manufac-

turers still looking for more good workmen and more materials. Neither problem appears to be clearing with the labor headache not likely to show much change because of the limitations inherent within it. As to materials, builders have "expeditors" and other experts seeking to obtain needed components with some small success indicated. New business continues to swell order books at a satisfactory pace and operations well into 1945 are assured. Reconversion is being discussed, but with pressure still on for war materials little change in this direction of ordinary business is likely. Orders, however, are available with the automotive manufacturers definitely interested in placing some good business. These, however, are still being looked at with an "if, as and when" attitude.

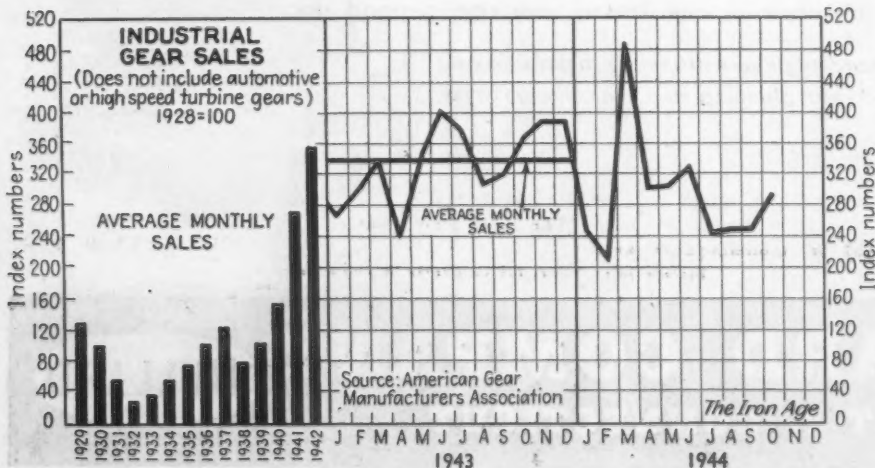
Oliver to Buy Equipment

Chicago

... Initial commitments have been made by the Oliver Corp., tractor and farm equipment manufacturers, for purchase of new plant equipment costing \$4,500,000, it is reported. The firm, which represents the merger of Oliver Farm Equipment Co. and Cleveland Tractor Co., effected Oct. 31, operates plants at Charles City, Iowa; South Bend, Ind.; Battle Creek, Mich.; Springfield, Ohio; Shelbyville, Ill., and Cleveland. Financing of the plant expansion and modernization program, it is reported, would be through a portion of the proceeds of an \$8,200,000 issue of 4 per cent preferred stock.

October Gear Sales Increase

... The gearing industry, as represented by the members of the American Gear Manufacturers Association, shows an increase in volume of sales for October, as compared with September, of 18 per cent. This report does not include turbine or propulsion gearing. The index figure for October was 293.

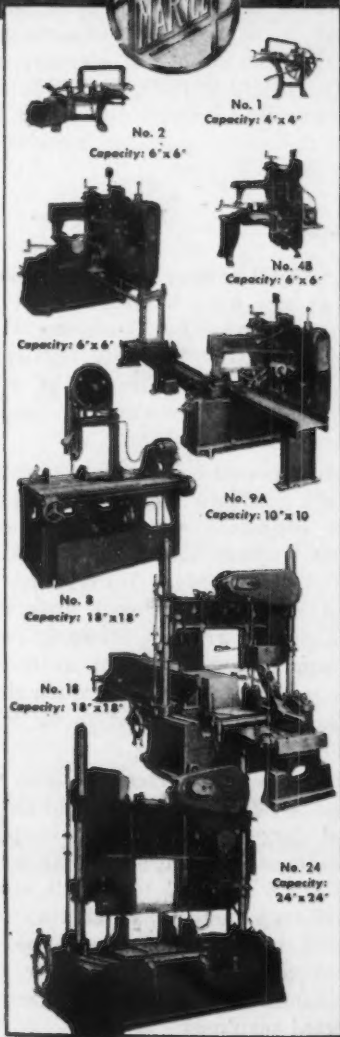


Road Plans Rehabilitation

Chicago

... Expenditure of \$1,190,000 for repair and reconditioning facilities has been programmed by the Chicago, Rock Island & Pacific Railway.

The program centers around the railroad's Chicago shops where general repairs of passenger equipment are made, and includes a new coach and paint shop, car servicing facilities, a new laboratory building, an oil storage building, steel, machine, cabinet and electric shops, pipe, tin, and airbrake shops, office, locker and stock rooms.



The MARVEL No. 8 does this job with ease— fast and economically

The Denver Shops of the Denver Rio Grande and Western Railroad, like numerous other railroad shops, have found the No. 8 MARVEL Universal Metal Cutting Band Saw Machine the ideal metal sawing machine. The illustration shows the cutting of floating rod bushings into three equal sections. Normally a difficult and expensive operation, this job is done on a No. 8 MARVEL Band Saw with ease, speedily and economically. No special tools, jigs, or high mechanical skill are required.

In railroad shops, as in many machine shops, tool rooms, and fabricating shops, there is a real need for a UNIVERSAL metal sawing machine that will cut the smallest, most delicate pieces as well as solid blocks 18" x 18". The No. 8 MARVEL Band Saw Machine answers these requirements and in addition will mitre, trim, notch and make re-entrant cuts.

The No. 8 MARVEL Metal Band Sawing Machine is but one machine in the MARVEL system. There is a MARVEL Metal Cutting Saw (either hack saw or band saw) for every shop's need. A local service engineer is available to survey your work without cost or obligation. He will recommend the best saw for your work, supplying accurate cost and production data. Write us asking for a call by a MARVEL sawing expert. A complete catalog is also available.

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MARVEL SAWS

NON-FERROUS METALS

... News and Market Activities

Magnesium Production Closing Down

Washington

... Pointing out that military use of the metal has continued to decrease and that surplus stocks have almost doubled the amount of the safety reserve established, WPB has announced that production of magnesium in government-owned plants will virtually cease by Jan. 1. Adding to those already closed will be the government-owned plants of the Dow Magnesium Co., Velasco, Texas, and the Electro Metallurgical Co., Spokane, Wash. Partial curtailment has been ordered at the Diamond Magnesium Co., Painesville, Ohio.

About 1200 workers will be released as a result of WPB action.

Other war jobs will be made available to them by the WMC's United States Employment Service, WPB said. In Spokane the employees will be offered jobs in the government-owned aluminum sheet mill.

WPB started reducing the output of magnesium last March. Since that time the following seven government-owned plants have closed: Dow Magnesium Co., Marysville and Ludington, Mich.; Amco Magnesium Co., Wingdale, N. Y.; Mathieson Alkali Works, Inc., Lake Charles, La.; Permanente Metals Corp., Manteca, Calif.; Basic Magnesium, Inc., Las Vegas, Nev.; Ford Motor Co., Dearborn, Mich., and International Minerals & Chemicals Corp., Austin, Tex.

per lb. This brings 2S solids to 8c., Dural solids to 3c., and low-copper alloy solids to 5.50c. Aluminum scrap is still plentiful however, and these and previous increases are considered to be a result of the establishment of minimum sale prices for government-owned aluminum scrap.

Mercury

... The price of mercury continues to rise since the shut down of marginal mines upon conclusion of the Metals Reserve Co. buying program in February. Mercury is currently selling at \$118 to \$120 per flask, delivered at New York City. It is a probability that certain mines would be reopened as current prices make their production profitable, except that the season of inclement weather is approaching for producing areas. Moreover labor would have to be found. It is the opinion of some dealers that the supply of mercury will continue tight at least until additional producers can get into production, and that the price may continue on its slow rise.

Copper

... Small arms plants closed about a year ago must be reopened, it has been announced by Chairman J. A. Krug of WPB. This will require an increase in the production of brass strip, since the ammunition consists of brass jacketed bullets.

It is expected by this move to double current production of small arms and it is estimated that an additional 62,200 workers must be obtained to man these plants. WPB hopes to avoid revoking any spot authorizations already granted. However pending applications for spot authorizations may be frozen to permit a study of the effect of this action on labor supply.

Statistics have recently been released by WPB on current and anticipated increases of copper supplies. From these figures it seemed apparent that WPB planned to permit stocks to build up faster than civilian production authorizations could be expected to use them. However this development should serve to reduce expected surpluses.

Navy Tests All-Magnesium Wings

... Magnesium airplane wings have been tested on Navy training planes for more than a year, it was revealed this week in New York by J. C. Mathes of Dow Chemical Co., Midland, Mich. Mathes spoke before the 65th Annual Meeting of the American Society of Mechanical Engineers.

The magnesium wing project was set up in 1940 in cooperation with the Navy Department and the Bureau of Aeronautics. The original set of wings was designed for the Navy SNJ-2 advanced trainer built by North American Aircraft Co. After static tests and minor design changes in 1942, 30 sets of wings were ordered and have since been in regular service. In addition to the magnesium wings and the standard aluminum sections, tests have been undertaken on SNJ models with wings of low carbon steel, stainless steel, plywood, and other materials.

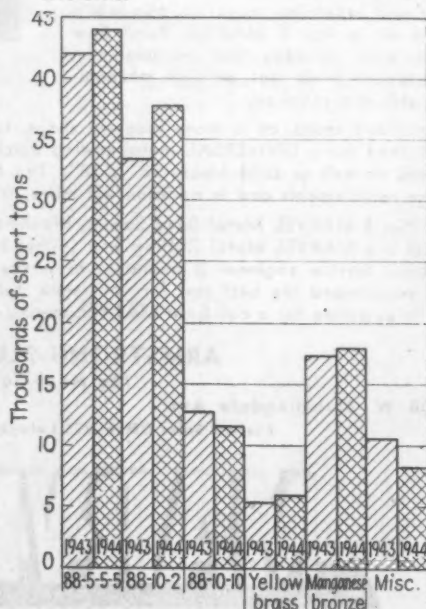
The magnesium wing, Mathes said, was 14 per cent lighter than the standard aluminum wing, and he stressed the importance of this weight reduction. "The saving of a single pound has been estimated as worth \$100 a year on a commercial plane," he said. "I am convinced that our success with these Navy wings fore-

shadows all-magnesium airplanes in the near future."

Aluminum Scrap

... Prices of aluminum scrap have strengthened again by another 1/2c.

INGOT PRODUCTION: Brass and Bronze by Alloy. Nine Months' Total, 1943 and 1944. Source: WPB Copper Division.



NON-FERROUS METALS PRICES

Primary Metals

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, del'd. (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be...	\$17.00
Cadmium, del'd.	90.00
Cobalt, 97-99% (per lb.)	\$1.50 to \$1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.5%, dollars per troy oz.	\$4.50
Iridium, dollars per troy oz.	\$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9+%, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	\$118 to \$120.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2) 9.00 to 10.00	
Aluminum, deoxidizing	
No. 2, 3, 4	6.00 to 9.50
Brass ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	20.37	
Copper, H.R.	17.37		
Copper drawn	18.37		
Low brass, 80%	20.40	20.15	
High brass		19.48	
Red brass, 85%	20.61	20.36	
Naval brass	20.37	19.12	24.50
Brass, free cut	15.01		
Commercial bronze, 90%	21.32	21.07	
Commercial bronze, 95%	21.53	21.28	
Manganese bronze	24.00	23.00	
Phos. bronze, A, B, 5%	36.50	36.25	
Muntz metal	20.12	18.87	22.75
Everdur, Herculey, Olympic or equal	25.50	26.00	
Nickel silver, 5%	28.75	26.50	
Architect bronze	19.12		

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)
 Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½I); 52S, 61c. (O); 24S, 67½c. (T).
 Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.3c.; 24S, 24.2c.
 Flat Sheet: 0.188 in. thickness: 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 23c.; 61S, factor No. 1 to 4, 23½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 84c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

NON-FERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	3.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	8.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25†
Manganese bronze solids	6.25†
Manganese bronze borings	6.50†
Manganese bronze borings	5.50†

OPA Group 4†

Refinery brass	4.75*
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*Price varies with analysis. †Lead content 0.00 to 0.40 per cent. ‡Lead content 0.41 to 1.00 per cent.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

Other Copper Alloys†

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S	3.00
25S	3.50
turnings, dry basis	2.50
Low copper alloys 51, 52, 61, 63S	
solids	5.50
turnings, dry basis	3.50

Plant scrap, mixed

Solids	3.00
Turnings, dry basis	2.00

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	4.50
Old castings and forgings	3.75
Pistons, free of struts	3.50
Pistons, with struts	2.00
Old alloy sheet	3.50

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

Zinc

New zinc clippings, trimmings	6.00
Engravers, lithographers plates	6.00
Old zinc scrap	4.75
Unsweetened zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.06

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ¼%, 26c. per lb.; 90 to 98% Ni, 26c. per lb. contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25½
Electrolytic, full size	22½
cut to size	30½
Rolled, oval, straight, 15 in. and longer	23½
Curved	24½
Brass: Cast, 82-20, elliptical, 15 in. and longer	23½
Zinc: Cast, 99.99, 16 in. and over	16½
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz., lots	40.82-41.125
Sodium cyanide, 94% dom., 100-lb. ums.	0.15
Zinc cyanide, 100-lb. dms.	32.00
Zinc sulphate, 89% crystals, bbls.	6.80

SCRAP

... News and Market Activities

Market Upswing Continues Rapid

••• As predicted last week the Pittsburgh market continues to strengthen and price increases are found in a number of grades similarly increased last week. To a lesser extent the other market areas are readjusting their prices.

There is evidence in several reports that mills are conscious of the rapidly growing trend toward higher prices and, having surveyed their inventories, are placing orders accordingly. It can be sensed from the market reports that optimism pervades the market, with dealers reluctant to make offerings in order to curtail the year's profit for tax purposes.

It is reported from Philadelphia that there is a return to ceiling prices in New England. Some prices have increased in Pittsburgh, Detroit, Chicago and New York. In other districts prices remain firm after last week's advances.

PITTSBURGH—Scarcity of scrap here is attributed to the dealers and producers, who are hesitant to sell. Dealers point to the fact that they have to turn practically all profit made now back to the tax collector, whereas they can hold their scrap until after the first of the year. Thus even with a low market they will be ahead of the game. Industrial concerns hold out for higher prices which they feel are in the offing. The consensus here is that through December, prices will stay at ceiling or close to ceiling, and after the turn of the year prices will sag again. Because of this trend, several railroads have been known to withdraw their lists and plan to hold the scrap for a few weeks.

CHICAGO—A more normal relationship between local price levels and those of Eastern markets appears to be in prospect. No further mill purchases here have occurred to disrupt prices of open hearth grades reported last week. Prices of railroad steel have been adjusted to reflect sales by local roads, and in some cases ceilings quoted represent on-line prices. Strength also is particularly evident in electric furnace grades.

PHILADELPHIA—Although the market here has been consistently improving in strength, tangible evidence of this has been received this week when some brokers were forced to pay increased prices to cover old orders. While mills are still paying \$15.50 a gross ton for No. 1 heavy melting steel scrap, the price to brokers has increased to \$16. Even at this price, brokers are finding difficulty in purchasing scrap because dealers are looking enviously at the return to ceiling prices in New England

and in some cases are holding out for higher prices. Most mills here are regulating incoming shipments on all scrap except cast, which continues in strong demand. Turnings are plentiful and although expected by some to become firmer as they reflect the rest of the scrap market, their price is not likely to increase in the same ratio as is expected of the heavy melting grades.

CLEVELAND—While there have been no new sales here, the market continues strong, with dealers paying slightly higher prices to cover old sales. Dealers are not anxious to sell, preferring to wait until the first of the year. In line with this week's higher operations figure, the market is definitely on the way up.

DETROIT—Prices firmed pretty much across the board here this week as lists of several automotive producers were closing. At the same time the largest local users of blast furnace and electric grades came into the market at higher prices, stiffening quotations in those categories. Some scrap sources feel that the current strength in the market is likely to continue to the point that ceiling prices are reached. But there is underlying caution born of the realization that each day that goes by brings the War's end in Europe closer, and with it a sharp break in quotations.

NEW YORK—At last open hearth scrap buying prices in this area have been increased to conform with the recent improvements in prices in districts throughout the country. In this district the rise to date amounts to \$1.50 per ton in all open hearth grades, with customary differentials maintained. There is no change in the price of turnings, and cast grades are still selling at ceilings. Dealers report that inventories of certain mills in this area have reached levels at which buying seems in order. There are other mills that have not apparently reached this point. Certain dealers look for still further improvement in prices of open hearth grades.

BOSTON—A sale of 1000 tons No. 1 navy yard steel at \$14.12 a ton to a broker to apply to an old eastern Pennsylvania mill order did not follow through marketwise. Following the sale yards were offered \$12.50 a ton for No. 1 steel but active brokers bid \$13 where the market now rests, up 50c. a ton as compared with a week ago but more than \$1 under the navy yard steel price. Actual sales have established shoveling turnings on a \$7 a ton basis and regular turnings as well as mixed borings and turnings \$5.50. Demand for foundry scrap at ceilings still exceeds supply.

BIRMINGHAM—While there is no im-

mediate price advance for material in this district, a slight increase in demand for scrap, particularly open hearth and blast furnace grades, has developed. Some shipyard scrap is reported moving into Northern markets.

CINCINNATI—With indications of better prices on recent railroad lists the market in this area is firmer but in the absence of large sales has remained unchanged. Dealers indicate that bidding up of prices in other districts for coverage on short contracts is tending to strengthen the market. Some buyers who thought they had sufficient inventory are showing interest in the possibility of purchases.

ST. LOUIS—Because of the slow movement of scrap iron to St. Louis dealers are becoming anxious about their commitments to mills, only two which have come into the market heavy melting steel has been advanced 25c. as a stimulus to the movement. Louisville & Nashville withdrew the item of 1200 tons of melting steel from its recent list because of unsatisfactory price offered. Eastern markets are said to be paying higher prices thus diverting material that ordinarily would come here. Maritime scrap totalling 4500 tons at a Gulf Port has been offered.

BUFFALO—Small sales of No. 1 heavy melting scrap at \$18 have cleared the market offerings at that figure. The general tone of the market is strong and some brokers who sold below current quotations have covered at increased prices. Reduced furnace operation of the leading consumer has had no apparent effect on bullish sentiment bids for more tonnage at last sale levels have brought no response from dealers. The belated arrival of five bargeloads of scrap over the last weekend marked the climax of a busy season on the Barge Canal. Two loads consisted largely of war equipment salvage from the Mediterraneans, probably the last that will be received here. The other three were cast iron scrap consigned to a Buffalo foundry. A lake vessel brought 5000 tons from Detroit and another is scheduled from that point before the close of navigation.

Enamelled Ware Faces Delay

Washington

••• The WPB Procelain Utensils Industry Advisory Committee at a recent meeting reported that one of the principal bottlenecks in the enamelled ware industry is the irregular delivery from the mills of cold rolled steel, 28 gage and heavier. Members of the committee said that relaxation of the 60-day material inventory restriction would tide manufacturers over such late delivery periods.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4).

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting..	\$18.00 to \$18.50
RR. hvy. melting...	20.25 to 20.75
No. 2 hvy. melting...	17.00 to 17.50
RR. scrap rails...	21.50
Rails 3 ft. and under	23.50
No. 1 comp'd sheets.	18.00 to 18.50
Hand bldd. new shts.	17.00 to 17.50
Hvy. axle turn...	16.50 to 17.00
Hvy. steel forge turn.	16.50 to 17.00
Mach. shop turn...	10.75 to 11.25
Short shov. turn...	13.50 to 14.00
Mixed bor. and turn...	10.75 to 11.25
Cast iron borings...	13.50 to 14.00
Hvy. break. cast...	16.50 plus frt.
No. 1 cupola...	20.00 plus frt.
RR. knuck. and coup.	22.50 to 23.00
RR. coil springs...	22.50 to 23.00
Rail leaf springs...	22.50 to 23.00
Roller steel wheels...	22.50 to 23.00
Low phos. billet crops	24.45
Low phos.	19.50 to 20.50
RR. malleable	22.00 plus frt.

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting..	\$17.25 to \$17.75
No. 2 hvy. melting...	16.00 to 16.50
No. 1 bundles	15.75 to 16.25
No. 2 dealers' bndls.	14.75 to 15.25
Galv. bundles (No. 3)	12.75 to 13.25
Mach. shop turn...	8.00 to 8.50
Short shoveling turn...	8.50 to 9.00
Cast iron borings...	8.50 to 9.00
Mix. bor. & short turn.	8.50 to 9.00
Low phos. hvy. forge	21.50 to 22.00
Low phos. plates...	20.00 to 20.50
No. 1 RR hvy. melting	19.25 to 19.75
Reroll rails	22.25
Cut rails, 3 ft. and under	22.25
Locomotive tires, cut	20.25 to 20.75
Cut bolsters & side frames	19.25 to 19.75
Angles & splice bars.	21.75 to 22.25
No. 3 steel wheels...	19.75 to 20.25
Couplers & knuckles	21.00 to 21.50
Miscellaneous rails ..	20.25
Agricul. malleable ..	20.50 to 21.00
RR. malleable	22.00
Standard stl. car axles	23.50 to 24.00
FOB shipping point	
No. 1 mach. cast	20.00
No. 1 agricul. cast...	20.00
Cast iron car wheels...	20.00
Hvy. breakable cast...	16.50
RR. grate bars	15.25
Brake shoes	15.25
Stove plate	19.00
Clean auto cast	20.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting..	\$16.50 to \$17.00
No. 2 hvy. melting...	15.50 to 16.00
No. 1 bundles	16.50 to 17.00
No. 2 bundles	14.50 to 15.00
Mach. shop turn	5.50 to 6.00
Shoveling turn	7.00 to 7.50
Cast iron borings...	7.50 to 8.00
Mixed bor. & turn...	6.00 to 6.50
No. 1 cupola cast...	21.00
Hvy. breakable cast...	16.50
Low phos. plate	20.00 to 21.00
Scrap rails	20.00 to 21.00
Stove plate	15.50 to 16.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting..	\$12.50 to \$13.00
No. 2 hvy. melting...	11.50 to 12.00
Bundled skeleton ..	11.50 to 12.00
Turnings, shovellings	6.50 to 7.00
Turnings, regular ..	5.00 to 5.50
Mixed bor. & turn...	5.00 to 5.50
Mixed alloy turn...	5.00 to 5.50
Clean cast. chem. bor.	12.56 to 14.15
Delivered to dry. per gr. ton	
Breakable cast	21.57 to 21.87
Stove plate	20.00 to 23.51
Machinery cast, truck	21.00 to 23.51

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting..	\$12.50 to \$13.00
No. 2 hvy. melting...	12.50 to 13.00
No. 1 bundles	12.50 to 13.00
New busheling	12.50 to 13.00
Mach. shop turn...	5.50 to 6.00
Short shov. turn...	7.75 to 8.50
Cast iron borings...	7.75 to 8.50
Mixed bor. & turn...	5.50 to 6.00
No. 1 cupola cast...	19.00 to 20.00
Charging box cast...	14.50 to 15.50
Hvy. breakable cast...	13.00 to 13.50
Stove plate	17.00 to 17.50
Flashings	12.50 to 13.00
Low phos. plate	15.00 to 16.00
Automotive cast	19.00 to 20.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting..	\$15.50
No. 2 hvy. melting...	14.50
No. 2 bundles	13.50
Mach. shop turn...	9.50
Shoveling turn	\$11.00 to 11.50
Cast iron borings...	10.00 to 10.50
Mixed bor. & turn...	9.50
No. 1 cupola cast...	*20.00
Hvy. breakable cast...	*16.50
Cast, charging box...	*19.00
Hvy. axle, forge turn.	16.00 to 16.25
Low phos. plate	18.50 to 19.00
Low phos. punchings.	19.00 to 19.50
Billet crops	18.50 to 19.00
RR. steel wheels	19.00 to 19.50
RR. coil springs	19.00 to 19.50
RR. malleable	*22.00

*F.o.b. shipping point.

ST. LOUIS

Per gross ton delivered to consumer:

Hvy. melting	\$16.25
No. 1 locomotive tires.	\$16.00 to 16.50
Misc. stand. sec. rails	17.00 to 17.50
Railroad springs	18.00 to 18.50
Bundled sheets	13.00 to 13.50
Heavy axle turn	8.00 to 8.50
Machine shop turns...	6.50
Rerolling rails	21.00
Steel car axles	21.00 to 21.50
Steel rails under 3 ft.	21.50
Steel angle bars	18.00 to 18.50
Cast iron car wheels...	20.00
No. 1 machinery cast	20.00
Railroad malleable ..	20.00 to 20.50
Breakable cast	16.50
Stove plate	17.00
Grate bars	15.25
Brake shoes	15.25

Note: Cast grades f.o.b. Shipping Point.

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting..	\$14.50 to \$15.00
No. 2 hvy. melting...	13.50 to 14.00
No. 2 bundles	13.50 to 13.00
No. 1 busheling	11.50 to 12.00
Scrap rails	14.00 to 14.50
Rails for rerolling ..	17.00 to 17.50
Rails 3 ft. & under...	17.00 to 17.50
Angles & splice bars.	16.50 to 17.00
Long turn	4.50 to 5.00
Cast iron borings...	6.50 to 7.00
Steel axles	14.50 to 15.00
Stove plate	16.50 to 17.00
Bar crops and plate.	16.00 to 16.50
Structural and plate.	16.00 to 16.50
No. 1 cast	20.00 to 21.00
Cast iron carwheels...	13.00 to 13.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting..	\$17.00 to \$17.50
No. 2 hvy. melting...	16.50 to 17.00
Low phos. plate	19.50 to 20.00
No. 1 busheling	17.00 to 17.50
Hydraulic bundles ..	17.00 to 17.50
Mach. shop turn...	10.00 to 10.50
Short shovel, turn...	12.50 to 13.00
Cast iron borings ..	11.50 to 12.00

NEW YORK

Dealers' buying prices, per gross ton, on cars:

No. 1 hvy. melting..	\$12.50 to \$13.00
No. 2 hvy. melting...	11.50 to 12.00
Hyd. comp. black bundles	10.50 to 11.00
Hyd. comp. galv. bundles	8.50 to 9.00
Hvy. breakable cast...	16.50
Charging box cast...	19.00
No. 1 cupola cast...	20.00
Clean auto cast...	20.00
Unstrip. motor blks.	17.50
Stove plate	19.00
Clean chem. cast bor.	14.33
Mach. shop turn...	5.50 to 6.00
Mixed bor. & turn...	5.50 to 6.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting...	\$17.50 to \$18.00
No. 1 bundles	15.50 to 16.00
No. 2 bundles	14.50 to 15.00
No. 2 hvy. melting...	15.50 to 16.00
Mach. shop turn...	9.00 to 9.50
Shoveling turn	11.00 to 11.50
Cast iron borings...	10.00 to 10.50
Mixed bor. & turn...	10.00 to 10.50
No. 1 cupola cast...	20.80 to 22.50
Stove plate	19.80 to 21.50
Low phos. plate	21.75
Scrap rails	19.00 to 19.25
Rails 3 ft. & under...	22.75
RR. steel wheels	23.75
Cast iron car wheels...	20.00
RR. coil & leaf Sprgs.	23.75
RR. knuckles & coup.	23.75
RR. malleable	22.00
No. 1 busheling	15.50 to 16.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting..	\$16.00 to \$16.50
No. 2 hvy. melting...	16.00 to 16.50
Compressed sheet stl.	16.00 to 16.50
Drop forge flashings.	15.50 to 16.00
No. 2 bundles	15.00 to 15.50
Mach. shop turn	8.00 to 8.50
Short shovel	11.50 to 12.00
No. 1 busheling	16.00 to 16.50
Steel axle turn	15.00 to 15.50
Low phos. billet and bloom crops	20.50 to 21.50
Cast iron borings...	11.50 to 12.00
Mixed bor. & turn...	10.50 to 11.00
No. 2 busheling	13.50 to 14.00
No. 1 machine cast...	20.00 plus frt.
Railroad cast	20.00 plus frt.
Railroad grate bars...	15.75
Stove plate	19.00 plus frt.
RR. hvy. melting...	18.00 to 18.50
Rails 3 ft. & under...	23.50 to 24.00
Rails 18 in. & under	24.75 to 25.25
Rails for rerolling ..	23.50 to 24.00
Railroad malleable ..	22.00 plus frt.
Elec. furnace punch.	18.50 to 19.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting..	\$16.00 to \$16.75
RR. hvy. melting...	16.00 to 16.75
No. 2 hvy. melting...	15.00 to 15.75
No. 2 bales	14.00 to 14.75
No. 3 bales	10.00 to 10.75
Mach. shop turn	7.00
Elec. furn 1 ft., under	16.00 to 17.50
No. 1 cupola cast ...	20.00 to 22.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting..	\$14.00 to \$15.00
No. 2 hvy. melting...	13.00 to 14.00
No. 2 bales	12.00 to 13.00
No. 3 bales	10.00 to 10.50
Mach. shop turn	5.00
No. 1 cupola cast ...	20.00 plus frt.

SEATTLE

Per gross ton delivered to consumer:

No. 1 hvy. melting...	\$13.50
RR. hvy. melting...	13.50
No. 3 bundles	11.50
Elec. furn. 1 ft., und.	\$16.00 to 17.00
No. 1 cupola cast ...	20.00

Comparison of Prices . . .

Advances Over Past Week in **Heavy Type**; Declines in *Italics*.

(Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs, rerolling	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
Wire rods	2.00	2.00	2.00	2.00
Skelp	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price table, pages 138-149.

Pig Iron: (Per Gross Ton)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
No. 2 fdy., Philadelphia	\$25.84	\$25.84	\$25.84	\$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	25.11	25.11	25.11	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa	25.34	25.34	25.34	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	37.34	37.34	37.34	31.34
Ferromanganese†	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
Heavy melt'g steel, P'gh.	\$18.25	\$18.25	\$16.00	\$20.00
Heavy melt'g steel, Phila.	15.50	15.50	14.50	18.75
Heavy melt'g steel, Ch'go	17.50	17.50	16.50	18.75
No. 1 hy. comp. sheet, Det.	12.75	12.50	11.25	17.85
Low phos. plate, Youngs'n	19.75	19.75	17.50	22.50
No. 1 cast, Pittsburgh	20.00*	20.00*	20.00*	20.00
No. 1 cast, Philadelphia	20.00*	20.00*	20.00*	20.00
No. 1 cast, Chicago	20.00*	20.00*	20.00*	20.00

*F.o.b. shipping point.

Coke, Connellsville: (Per Net Ton at Oven)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
Furnace coke, prompt	\$7.00	\$7.00	\$7.00	\$6.50
Foundry coke, prompt	8.25	8.25	8.25	7.50

Non-Ferrous Metals: (Cents Per Lb. to Large Buyers)	Nov. 28, 1944	Nov. 21, 1944	Oct. 24, 1944	Nov. 30, 1943
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . . .

FINISHED STEEL

November 28, 1944	2.30837c. a Lb.
One week ago	2.30837c. a Lb.
One month ago	2.30837c. a Lb.
One year ago	2.25513c. a Lb.

	HIGH	LOW
1944	2.30837c., Sept. 5	2.272349c., Jan. 4
1943	2.25513c.,	2.25513c.,
1942	2.26190c.,	2.26190c.,
1941	2.43078c.,	2.43078c.,
1940	2.30467c., Jan. 2	2.24107c., Apr. 16
1939	2.35367c., Jan. 3	2.26689c., May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18
1937	2.58414c., Mar. 9	2.32263c., Jan. 4
1936	2.32263c., Dec. 28	2.05200c., Mar. 10
1935	2.07642c., Oct. 1	2.06492c., Jan. 8
1934	2.15367c., Apr. 24	1.95757c., Jan. 2
1933	1.95578c., Oct. 3	1.75836c., May 2
1932	1.89196c., July 5	1.83901c., Mar. 1
1931	1.99626c., Jan. 13	1.86586c., Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

23.61 a Gross Ton	23.61 a Gross Ton
23.61 a Gross Ton	23.61 a Gross Ton
23.61 a Gross Ton	23.61 a Gross Ton
23.61 a Gross Ton	23.61 a Gross Ton
23.61, Mar. 20	23.45, Jan. 2
23.45, Dec. 23	22.61, Jan. 2
22.61, Sept. 19	20.61, Sept. 12
23.25, June 21	19.61, July 6
23.25, Mar. 9	20.25, Feb. 16
19.74, Nov. 24	18.73, Aug. 11
18.84, Nov. 5	17.83, May 14
17.90, May 1	16.90, Jan. 27
16.90, Dec. 5	13.56, Jan. 3
14.81, Jan. 5	13.56, Dec. 6
15.90, Jan. 6	14.79, Dec. 15
18.21, Jan. 7	15.90, Dec. 16
18.71, May 14	18.21, Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

SCRAP STEEL

\$17.08 a Gross Ton	\$17.08 a Gross Ton
\$17.08 a Gross Ton	\$17.08 a Gross Ton
\$15.67 a Gross Ton	\$15.67 a Gross Ton
\$19.17 a Gross Ton	\$19.17 a Gross Ton
\$19.17, Apr. 10	\$22.00, Jan. 7
16.04, Apr. 9	21.83, Dec. 30
14.08, May 16	22.50, Oct. 3
11.00, June 7	15.00, Nov. 22
12.67, June 8	21.92, Mar. 30
12.67, June 9	17.75, Dec. 21
10.33, Apr. 29	13.42, Dec. 10
9.50, Sept. 25	13.00, Mar. 13
6.75, Jan. 3	12.25, Aug. 8
6.43, July 5	8.50, Jan. 12
8.50, Dec. 29	11.33, Jan. 6
11.25, Dec. 9	15.00, Feb. 18
14.08, Dec. 3	17.58, Jan. 29

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



2 3/4% Nickel Steel locomotive rods,
one bent cold to show ductility.

QUENCHED AND TEMPERED
NICKEL STEEL
FORGINGS COMBINE

EXCEPTIONAL DUCTILITY WITH HIGH TENSILE STRENGTH

Composition and Typical Properties of Normalized Quenched and Tempered 2 3/4% Nickel Steel Rods

Description or Size	Melt Yield Pt. No. #s per Sq. In.	Tensile Strength #s per Sq. In.	Elong. % in 2 In.	Reduc- tion in Area %	ANALYSIS					
					Car.	Mang.	Phos.	Sul.	Sil.	Ni
Main Rod....	92900	110000	25.0	64.4	.31	.78	.027	.026	.25	2.75
Main Rod....	86500	104500	25.5	65.6	.32	.86	.034	.032	.29	2.69
Main Rod....	86360	104400	26.0	64.8	.32	.86	.034	.032	.29	2.69
Main Rod....	87850	102350	26.0	66.2	.31	.89	.037	.025	.32	2.69
Front Rod....	86000	102250	25.0	67.3	.29	.82	.035	.027	.24	2.71
Front Rod....	83900	104250	25.0	66.1	.29	.82	.035	.027	.24	2.71
Front Rod....	86850	104250	27.0	66.1	.32	.86	.035	.025	.30	2.65
Front Rod....	89500	107050	25.5	65.6	.32	.86	.035	.025	.30	2.65
Back Rod....	89500	107650	25.0	62.7	.30	.79	.030	.025	.22	2.71
Back Rod....	87500	106450	25.0	65.4	.29	.82	.035	.027	.24	2.71
Back Rod....	87000	105600	25.0	65.4	.29	.82	.035	.027	.24	2.71
Back Rod....	88150	104850	26.0	66.8	.29	.82	.035	.027	.24	2.71

Specimens Taken from Mid-Section of Prolongations of the Forgings

The above table compiled by the American Locomotive Company shows the chemical compositions and mechanical properties of some normalized, quenched and tempered nickel steel front, main and back rods recently produced as replacement rods for locomotives being speeded up and rebalanced. These values are typical of replacement rod forgings recently tested by that company.

Quenched and tempered nickel steel forgings provide high tensile strength and ductility, combined with unusual toughness and high fatigue strength—qualities which tend to obviate breakage and assure long, trouble-free service when employed in heavy duty machinery and equipment.



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THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York 5, N. Y.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10¢ per lb. under base; primes 25¢ above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50¢. (14) This base price for annealed, bright finish wires, commercial spring wire.

Basing Point ↓ Product													DELIVERED TO			
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	Detroit	New York	Phila- delphia	
Hot Rolled Sheets	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢	
Cold Rolled Sheets ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢	
Galvanized Sheets (24 gage)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢	
Enameling Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢	
Long Ternes ²	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢	
Hot Rolled Strip ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢		
Cold Rolled Strip ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.90¢	3.16¢		
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢		
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢		(Worcester = 3.35¢)				3.05¢	3.31¢		
Coke Tin Plate, Base Box	\$5.00	\$5.00	\$5.00						\$5.10					5.36¢	5.32¢	
.25 .50 .75 Electro Tin Plate, Box	\$4.35 \$4.50 \$4.65	\$4.35 \$4.50 \$4.65	\$4.35 \$4.50 \$4.65						\$4.60 \$4.75							
Black Plate (29 gage) ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ¹³			3.37¢	
Mfg. Ternes, Special Box	\$4.30	\$4.30	\$4.30						\$4.40							
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢	
Rail Steel Bars ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢				
Reinforcing (Billet) Bars ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢ ¹³	2.25¢	2.39¢		
Reinforcing (Rail) Bars ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢ ¹³	2.25¢		2.47¢	
Cold Finished Bars ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)		(Toledo = 2.80¢)			2.99¢	2.97¢	
Alloy Bars, Hot Rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton = 2.70¢)				2.80¢			
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢			
Carbon Steel Plates	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)	2.10¢	2.35¢	2.45¢	2.65¢	2.32¢	2.29¢	2.15¢
Floor Plates	3.35¢	3.35¢										3.70¢	4.00¢		3.71¢	3.67¢
Alloy Plates	3.50¢	3.50¢							(Coatesville = 3.50¢)			3.95¢	4.15¢		3.70¢	3.59¢
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.45¢	2.75¢		2.27¢	2.215¢	
SPRING STEEL, C-R 0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)							
Bright Wire ¹⁴	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)	(Duluth = 2.65¢)	3.10¢				2.92¢	
Galvanized Wire									Add proper size extra and galvanizing extra to Bright Wire base.							
Spring (High Carbon)	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)			3.70¢			3.52¢	
Steel Sheet Piling	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢	

EXCEPTIONS TO PRICE SCHED. NO. 6
Slabs—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. \$41; Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Granite City Steel \$47.50. **Blooms**—Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Pgh. Steel Co. (reroll) \$38.25, (forging) \$44.25. Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth. **Sheet bar**—Empire Sheet & Tin Plate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio. **Billets, Forging**—Andrews Steel Co. \$50 basing pts.; Follansbee Steel Corp. \$49.50 Toronto; Phoenix Iron Co. \$47.00 mill. **Geneva Steel Co.** \$64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. \$49.50. **Billets, Rerolling**—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$54 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Corp. 4 in. sq. or larger \$37.75, smaller \$39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Continental Steel Corp. (1% x 1%) \$39.50, (2 x 2) \$40.60 Kokomo, Ind. (these prices include \$1 size extra); Keystone Steel & Wire Co. \$36.40 Peoria; Connors Steel Co. \$50.60 Birmingham; Ford Motor Co. \$34 Dearborn, Mich. Geneva Steel Co. \$53.64 f.o.b. Pac. C. Pgt. Steel Co. \$43.50.

Structural Shapes—Phoenix Iron Co. \$23.35 basing pts. (export) \$25.50 Phoenixville; Knoxville Iron Co. \$23.30 basing points. **Rails**—Sweet Steel Co. (rail steel) 350 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp., \$45 Pueblo. **Hot Rolled Plate**—Granite City Steel Co. \$2.65 mill; Knoxville Iron Co. \$2.25 basing pts.; Kaiser Co. and Geneva Steel Co. \$3.20 Pacific Ports; Central Iron and Steel Co. \$2.50 basing points; Granite City Steel Co. \$2.35 Granite City. **Merchant Bars**—W. Ames Co., 10 tons and over, \$2.85 mill; Eckels-Nye Steel Corp., \$2.50 basing pts. (rail steel) \$2.40; Phoenix Iron Co. \$2.40 basing pts.; Sweet Steel Co. (rail steel) \$2.35 mill; Joslyn Mfg. & Supply Co., \$2.35 Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar) \$2.35 Chicago; Knoxville Iron Co. \$2.30 basing pts. **Laclede Steel Co.**, sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill. Milton Mfg. Co. \$2.75 f.o.b. Milton, Pa. **Pipe Skelp**—Wheeling Steel Corp., Benwood, \$2.05 per cwt. **Reinforcing Bars**—W. Ames & Co., 10 tons and over, \$2.85 mill; Sweet Steel Co. (rail steel) \$2.35 mill; Columbia Steel Co. \$2.50 Pacific Ports. **Cold Finished Bars**—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass.,

f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis. **Alloy Bars**—Texas Steel Co. for delivery except Texas and Okla. Chicago, base, f.o.b. Fort Worth, Tex.; Connors Steel Co. shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham. **Hot Rolled Strip**—Joslyn Mfg. & Supply Co. \$2.30 Chicago; Knoxville Iron Co. \$2.25 basing pts. **Hot Rolled Sheets**—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., \$2.25 Parkersburg. **Galvanized Sheets**—Andrews Steel Co. \$3.75 basing pts.; Parkersburg Iron & Steel Co. \$3.85 Parkersburg; Apollo Steel Co. \$3.75 basing pts.; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease. **Pipe and Tubing**—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa. **Black Sheets**—Empire Sheet and Tinplate Co., maximum base price mill is \$2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.



STEWART

THE BEST INDUSTRIAL FURNACES MADE

No. 54
OF A
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of Typical
Installations

For HEAT TREATING LEAF SPRINGS

at the Standard Steel Spring Company, New Castle, Pa.



The problem of getting uniformity in heat treating leaf springs is difficult, due to the size of the spring and the great variation in length of the leaves in a single spring. A considerable amount of the possible variation is avoided by running all the leaves of each spring through the heat treating process at the same time. However, only an unusually well designed and properly operated furnace can be depended upon to make a six-foot leaf uniform from end to end and to give a one-foot leaf the same physical qualities as a six-foot leaf. The furnace must maintain the temperature within very close, predetermined limits and provide absolutely uniform conditions throughout.

Standard Steel Spring Company, for many years prominent in the heat treating of metals, and a prior user of Stewart Furnaces, has recently added to its furnace equipment by purchasing Stewart Hardening and Draw Furnaces for two plants to meet its increased production schedules for leaf springs.

This installation is typical of the industrial furnaces Stewart engineers are building every day, both large types to meet the specified requirements of manufacturers all over the continent, and a complete line of standard types.



Interior of Stewart Draw Furnace from the charging end showing the conveyor belt.



Discharge end of the Stewart Recirculating Draw Furnace showing Conveyor Belt drive through speed reducer and variable speed transmission.

STEWART INDUSTRIAL FURNACE DIVISION of CHICAGO FLEXIBLE SHAFT CO.

Main Office: 5600 W. Roosevelt Road, Chicago 50, Ill. — Canada Factory: (FLEXIBLE SHAFT CO., LTD.) 321 Weston Rd., So., Toronto 9

A letter, wire or 'phone call will promptly bring you information and details on STEWART furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a STEWART engineer will be glad to call and discuss your heat treating problems with you.

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 9417-20	Cold Drawn, NE 9442-45 Ann.	Cold Drawn, NE 9442-45 Ann.
Philadelphia	3.518	4.872*	5.018a	3.922	4.772	3.605	3.668	3.922	4.072	5.968	7.068	7.272	8.322
New York	3.590	4.813*	5.010	3.974*	4.772	3.788	3.758	3.933	4.103	6.008	7.108	7.303	8.383
Boston	3.744	4.744*	5.224*	4.108	4.715	3.912	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.394	4.852	4.894	3.902	4.762	3.594	3.758	3.902	4.052	.....	.....	.....	.....
Norfolk	3.771	4.865	5.371	4.165	4.865	3.971	4.002	4.065	4.165	.....	.....	.....	.....
Chicago	3.25	4.20	5.231	3.60	4.651*	3.85	3.85	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337*	5.274*	3.737	4.7871*	3.867	3.867	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.874*	3.60	4.45	3.40	3.588	3.38	3.75	5.958	7.058	6.85	7.90
Buffalo	3.35	4.40	4.75*	3.618	4.669	3.63	3.40	3.38	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.00*	3.70	4.6591*	3.609	3.661	3.45	3.80	6.06	7.16	7.159	8.209
Cincinnati	3.425	4.475*	4.825*	3.675	4.711	3.611	3.691	3.611	4.011	.....	.....	.....	.....
St. Louis	3.397	4.347*	5.172*	3.747	4.8311*	3.697	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.51	4.48	5.257*	3.88	4.391*	3.811*	3.811*	3.761*	4.361	6.09	7.19	7.961	8.711
Omaha	3.865	5.443	5.608*	4.215	.....	4.185	4.185	4.115	4.43	.....	.....	.....	.....
Indianapolis	3.58	5.58	4.968	4.918	3.768	4.78	3.63	3.58	3.96	6.06	7.16	7.16	8.23
Birmingham	3.45	.....	4.75	3.70	.....	3.55	3.55	3.50	4.43	.....	.....	.....	.....
Memphis	3.965*	4.68	3.265	4.215	.....	4.065	4.065	4.015	4.33	.....	.....	.....	.....
New Orleans	4.058*	4.95	5.358	4.308	.....	4.158	4.158*	4.108*	4.629	.....	.....	.....	.....
Houston	3.753	5.573	5.313*	4.313	.....	4.25	4.25	3.75	6.373*	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20*	8.10*	4.95	5.8131*	4.95	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.5614	7.30*	6.35*	4.5614	7.3331*	4.8514	4.3514	4.1514	5.333	8.304	9.404	9.404	10.454
Seattle	4.6512	7.05*	5.95*	4.2512	.....	4.7512	4.4512	4.3512	5.733	8.304	9.404	9.404	10.454
Portland	4.6511	6.60*	5.75*	4.7511	.....	4.7511	4.4511	4.4511	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.5317	.....	6.171*	5.5317	.....	4.9817	4.9817	4.8817	5.90	.....	.....	.....	.....

MILL EXTRAS FOR NATIONAL EMERGENCY STEELS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 1330	0.10¢	\$2.00	.....	.....	NE 9415	0.75¢	\$15.00	\$1.25	\$25.00
NE 1335	0.10	2.00	.....	.....	NE 9417	0.75	15.00	1.25	25.00
NE 1340	0.10	2.00	.....	.....	NE 9420	0.75	15.00	1.25	25.00
NE 1345	0.10	2.00	.....	.....	NE 9422	0.75	15.00	1.25	25.00
NE 1350	0.10	2.00	.....	.....	NE 9425	0.75	15.00	1.25	25.00
NE 9612	0.65¢	\$13.00	\$1.15	\$23.00	NE 9427	0.75	15.00	1.25	25.00
NE 9615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 9617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 9620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 9622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 9625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 9627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 9630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 9632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 9635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 9637	0.65	13.00	1.15	23.00	NE 9722	0.65¢	\$13.00	\$1.15	\$23.00
NE 9640	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 9642	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 9645	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
NE 9647	0.65	13.00	1.15	23.00	NE 9742	0.65	13.00	1.15	23.00
NE 9650	0.65	13.00	1.15	23.00	NE 9745	0.65	13.00	1.15	23.00
NE 9712	0.70¢	\$14.00	\$1.20	\$24.00	NE 9747	0.65	13.00	1.15	23.00
NE 9715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 9717	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 9720	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 9722	0.70	14.00	1.20	24.00	NE 9830	\$1.30	\$26.00	\$1.80	\$36.00
NE 9725	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 9727	0.70	14.00	1.20	24.00	NE 9835	1.30	26.00	1.80	36.00
NE 9730	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 9732	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 9735	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 9737	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 9740	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 9742	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 9745	0.70	14.00	1.20	24.00	NE 9912	\$1.20	\$24.00	\$1.55	\$31.00
NE 9747	0.70	14.00	1.20	24.00	NE 9915	1.20	24.00	1.55	31.00
NE 9750	0.70	14.00	1.20	24.00	NE 9917	1.20	24.00	1.55	31.00
NE 9255	0.40¢	\$8.00	.....	.....	NE 9920	1.20	24.00	1.55	31.00
NE 9260	0.40	8.00	.....	.....	NE 9922	1.20	24.00	1.55	31.00
NE 9261	0.65	13.00	.....	.....	NE 9925	1.20	24.00	1.55	31.00
NE 9262	0.65	13.00	.....	.....	NE 52100A	.....	.....	2.60	\$52.00
					NE 52100B	.....	.....	2.60	52.00
					NE 52100C	.....	.....	2.60	52.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, A.I.S.I. Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and \$5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip, and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over. (19) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

Per Gross Ton
Old range, bessemer, 51.50 \$4.71
Old range, non-bessemer, 51.50 4.60
Mesaba, bessemer, 51.50 4.60
Mesaba, non-bessemer, 51.50 4.45
High phosphorus, 51.50 4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSAPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Base price per short ton
Effective CaF₂ Content:
70% or more \$33.00
65% but less than 70% 32.00
60% but less than 65% 31.00
Less than 60% 30.00



On Yesterday's "Hair Trunks" . . .

On Today's Airplane Luggage . . .

*Brass is
always Modern*

In thousands of rural attics, today, there are battered old trunks and chests whose locks and catches are still fit for active service, and whose brilliance could be restored by a quick polishing. For these are exactly the same metal as that used in much of the smartly designed, modern luggage . . . honest, long-lived Brass hardware that has the strength and resilience to hold together a tough situation like an overstuffed suitcase, without flying open or sticking shut.

This is one of the countless uses in which Brass itself has always been the most modern material, no matter how often it has been changed in its forms to fit a change in fashion. For the unique qualities of this versatile alloy place it beyond reach of substitutes, either in adaptability to fabrication or serviceability in use. Then when you consider the quality for which the Bristol brand of Brass is known . . . dimensional and physical accuracy in every shipment of sheet, rod, and wire . . . you can see why so many manufacturers have gained new advantages in production, selling, and customer-loyalty through the standard use of Bristol Brass. And when Brass puts on civilian clothes again, Bristol will be ready to impart these advantages to *your own* peacetime products.



Bristol Brass

THE BRISTOL BRASS CORPORATION, BRISTOL, CONNECTICUT · MAKERS OF BRASS SINCE 1850

STOP DOLLAR LOSS FROM RUST

TECTYL'S THIN FILM PROTECTS METAL SURFACES!



Proven Protection

Tectyl lets NO moisture reach the metal, eliminating all possibility of rust or corrosion damage for as long as two years. Tectyl protection has been proven under all conditions, including fresh and salt water atmospheres. Prove it in your own plant—it's transparent—you can see that it is protecting. A little Tectyl covers a LOT of surface. Easy to apply and remove, economical to use, Tectyl protection is *positive*.

Five Specialized Types

The Navy used Tectyl in salvaging the submarine Squalus—however tough and different YOUR special rust problem may be, there's a Tectyl product that will lick it and save you money and man-hours. Write NOW indicating your corrosion problem, and we will send you Tectyl bulletin with complete application data.

TECTYL STOPS RUST

VALVOLINE OIL COMPANY

Finest Lubricating Oils Since 1866

468 Culvert Street Cincinnati 2, Ohio

Refinery at Butler, Pennsylvania

General Offices, Cincinnati, Ohio

New York - Atlanta - Detroit - Chicago - Los Angeles - Vancouver - Washington, D. C.

PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Re-rolling

Base per gross ton, f.o.b. mill.... \$31.00
Exceptions: Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., \$34.25; Pgh. Steel Co., \$33.10.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown..... \$36.00

Exceptions: Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., \$38.10.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh..... \$45.00

Exceptions: C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (re-rolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12 higher. Provo, \$11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

Per Gross Ton

Re-rolling..... \$34.00
 Forging quality..... 40.00

For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton..... \$54.00
 Price delivered Detroit \$2.00 higher; E. Michigan, \$3.00 higher.

Shell Steel

Per Gross Ton

3 in. to 12 in. \$52.00
 12 in. to 18 in. 54.00
 18 in. and over 56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.00 higher; E. Michigan, \$3 higher.

Price Exception: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of \$52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

Per Gross Ton

Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared .. 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland ... 2.00c.

Worcester, Mass. 2.10c.

Birmingham 2.60c.

San Francisco 2.50c.

Galveston 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

Base per lb.

High speed 67c.

Straight molybdenum 54c.

Tungsten-molybdenum 57 1/2c.

High-carbon-chromium 43c.

Oil hardening 24c.

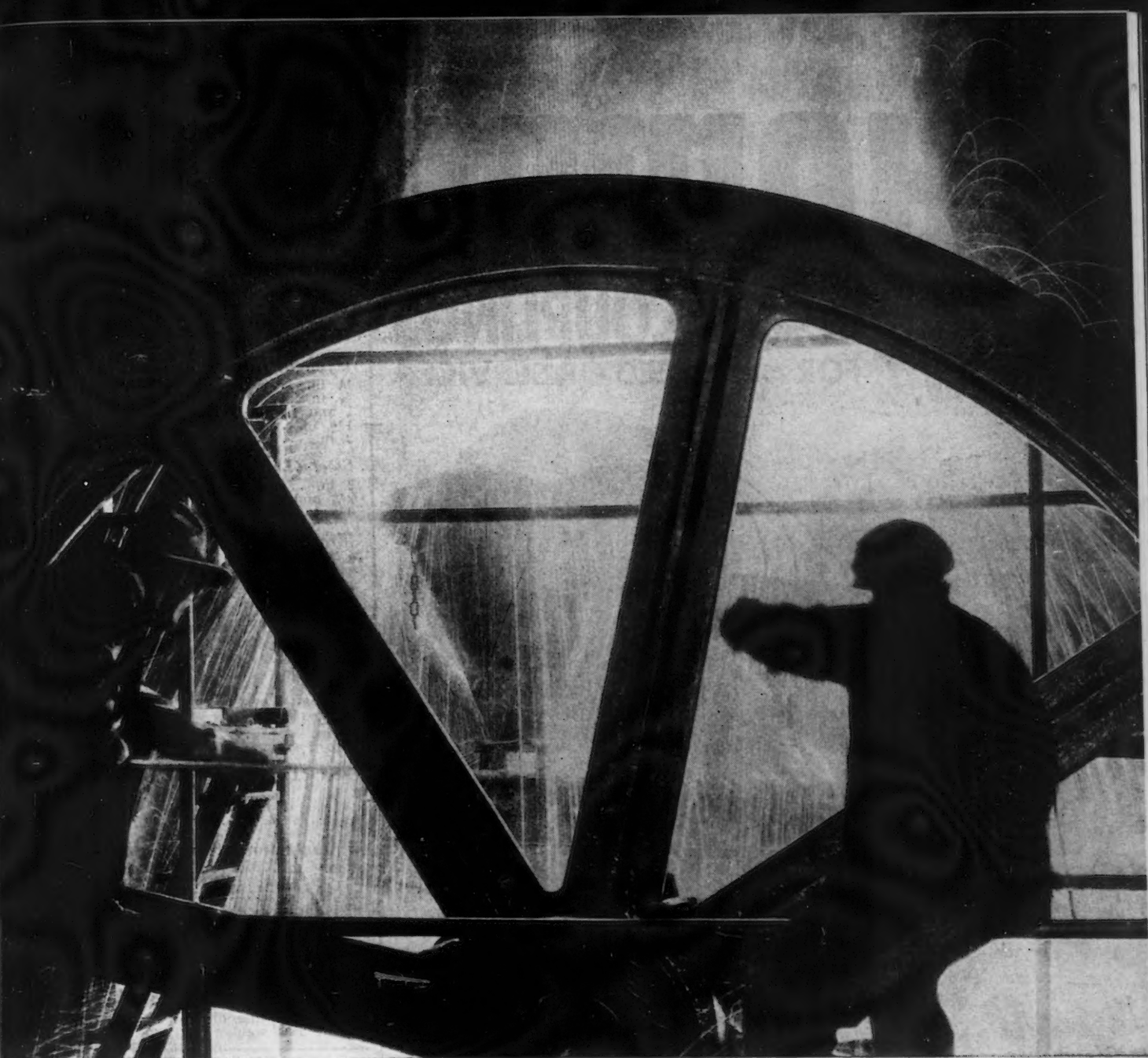
Special carbon 22c.

Extra carbon 18c.

Regular carbon 14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

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67c.
54c.
7 1/2c.
43c.
24c.
22c.
18c.
14c.
Mississippi



HOW TO *Shorten a Shutdown* IN A BREAKDOWN

When a high tonnage part such as a crankshaft... steel mill roll or pinion gear suddenly lets go, the usual result is a lengthy shutdown. For, these and similar heavy-duty units are still hard to replace... hard to repair by slow, ordinary methods.

The easier... faster way to break this bottleneck is to repair by Thermit welding. This simpler... lower cost method restores broken pieces

to operation within a few days... durably welded for long-lasting, dependable service. Use it for fabricating heavy weldments, too.

There's no limit to the size of the weld... nor does it matter whether the part is cast or forged.

Repairs by Thermit welding may be done in your plant by your own crew under the supervision of M & T engineers, or at one of the Metal &

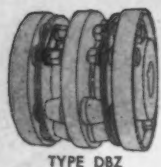
Thermit plants located at Jersey City, N. J., Chicago, Ill., Pittsburgh, Pa., or So. San Francisco, Cal.

For details, send for your copy of "Thermit Welding" today.

THERMIT
Welding 

THOMAS

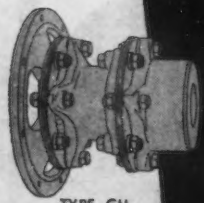
Flexible COUPLINGS FOR any SPEED OR SERVICE



TYPE DBZ



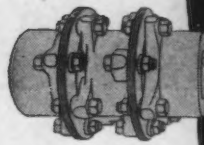
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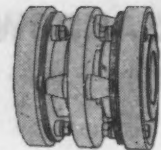
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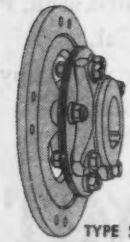
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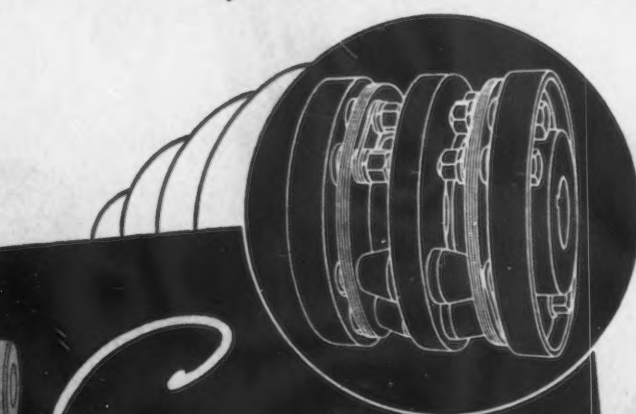
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TYPE SS

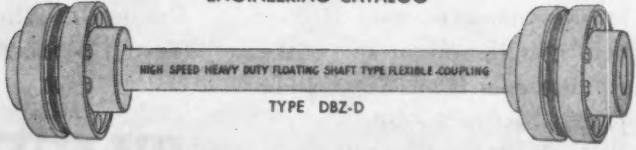


Eliminate
**BACKLASH, FRICTION,
WEAR AND CROSS-PULL**
.....the 4 destructive evils found in
all other types and makes of couplings.

**NO BACKLASH
NO WEAR
NO LUBRICATION
NO THRUST
FREE END FLOAT**

These are the five essential features of
Thomas Flexible Couplings that insure
a permanent care-free installation.

WRITE FOR COMPLETE
ENGINEERING CATALOG



TYPE DBZ-D

**THE THOMAS PRINCIPLE ELIMINATES CHAINS,
SPUR GEARS and other VIBRATING MAKESHIFTS**

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District
and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—\$200.00 per Net Ton

Steel (Butt Weld)

	Black	Galv.
1/2 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron (Butt Weld)

1/2 in.	24	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Steel (Lap Weld)

2 in.	61	49 1/2
2 1/2 and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2

Wrought Iron (Lap Weld)

2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17

Steel (Butt, extra strong, plain ends)

1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron (Same as Above)

1/2 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

Steel (Lap, extra strong, plain ends)

2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

Wrought Iron (Same as Above)

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21

On butt weld and lap weld steel pipe
jobbers are granted a discount of 5%. On
less-than-carload shipments prices are
determined by adding 25 and 30% and
the carload freight rate to the base card.
F.o.b. Gary prices are two points lower
discount or \$4 a ton higher than Pitts-
burgh or Lorain on lap weld and one
point lower discount, or \$2 a ton higher
on all butt weld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago ...	\$54.80
6-in. and larger, del'd New York ...	52.20
6-in. and larger, Birmingham ...	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles ...	69.40
6-in. and larger f.o.b. cars, Seattle ...	71.20
Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.	

BOILER TUBES

Seamless Steel and Lap Weld Commercial
Boiler Tubes and Locomotive Tubes,
Minimum Wall. Net base prices per 100
ft. f.o.b. Pittsburgh, in carload lots.

	Seamless	Lap Weld
	Cold Drawn	Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04
2 1/2 in. o.d. 12 B.W.G.	20.21	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50
3 1/2 in. o.d. 11 B.W.G.	28.37	24.62
4 in. o.d. 10 B.W.G.	35.20	30.54

(Extras for less carload quantities)

40,000 lb. or ft., and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	Base per Keg	
Standard wire nails...	\$2.55	\$3.05
Coated nails	2.55	3.05
Cut nails, carloads ...	3.85	...
	Base per 100 lb.	
Annealed fence wire...	\$3.05	\$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence* ...	.67	.85
Fence posts, carloads..	.69	.86
Single loop bale ties...	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barless wire..	.70	...

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter...	65½
3/16 & ½ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. shorter	61
1½ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1¼ to 1½ in. inclusive	57
1½ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

Base discount less keg lots

7/16 in. and smaller	64
¾ in. and smaller	62
¾ in. through 1 in.	60
9/16 in. through 1 in.	59
1¼ in. through 1½ in.	57
1½ in. and larger	56

In full keg lots, 10 per cent additional discount.

Stove Bolts

Consumer

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 35c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
---	--------

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5
---	----------

Consumer

Cap and Set Screws Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51
Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.	

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
30-lb. coating I.C.	7.50	15.00

Hinge Your Products with Wagner Continuous Hinges



MODERN design calls for Continuous Hinges, which permit flush fitting for improved appearance and security. Wagner has developed special machines and methods for producing Continuous Hinges fast and economically in any metal — any length, width and finish. Engineered to your specific requirements, they can be perforated, counter sunk, formed or spring loaded. You'll find Wagner a dependable source for Continuous Hinges of any kind. For your present or future products, we'll work with you confidentially. Write today.

E. R. WAGNER MFG. COMPANY
4613 North 32nd Street • Milwaukee 9, Wisconsin

Since 1899 producers of Metal Stampings and Specialties, Hinges and Hardware, Machine-Applied Hinges, Rolled Butt-Joint Spacers and Bushings.

PRICES PIG IRON

All prices set in bold face type are maximum established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maximum. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos- phorus	Charcoal
Boston.....	\$25.50	\$25.00	\$26.50	\$26.00	.....	.....
Brooklyn.....	27.50	27.00	.....	25.00	.....	.....
Jersey City.....	26.53	26.03	27.53	27.03	.....	.....
Philadelphia (4).....	25.84	25.34	26.84	26.34	\$30.74	.....
Bethlehem, Pa.....	\$25.00	\$24.50	\$26.00	\$25.50	.....	.....
Everett, Mass.....	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.....	.....	24.50	.....	.....	.....	.....
Steelton, Pa.....	.....	24.50	.....	.....	\$29.50	.....
Birdsboro, Pa. (3).....	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.....	25.00	24.50	.....	.....	.....	.....
Erie, Pa.....	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.....	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa. (1).....	24.00	23.50	24.50	24.00	.....	.....
Buffalo.....	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati, Ohio.....	25.11	24.61	.....	25.11	.....	.....
Canton, Ohio.....	25.39	24.89	25.39	25.39	32.89	.....
Mansfield, Ohio.....	25.94	25.44	26.44	25.94	32.86	.....
St. Louis.....	24.50	24.50	.....	.....	.....	.....
Chicago.....	24.00	23.50	24.50	24.00	35.46	\$37.34
Granite City, Ill.....	24.00	23.50	24.50	24.00	.....	.....
Cleveland.....	24.00	23.50	24.50	24.00	32.42	.....
Hamilton, Ohio.....	24.00	23.50	.....	24.00	.....	.....
Toledo.....	24.00	23.50	24.50	24.00	.....	.....
Youngstown.....	24.00	23.50	24.50	24.00	32.42	.....
Detroit.....	24.00	23.50	24.50	24.00	.....	.....
Lake Superior Fe.....	.....	.....	.....	.....	34.00	.....
Lyles, Tenn., Fe. (2).....	.....	.....	.....	.....	33.00	.....
St. Paul.....	26.63	26.13	27.1	26.63	39.80	.....
Duluth.....	24.50	24.00	25.00	24.50	.....	.....
Birmingham.....	20.38	19.00	25.00	.....	.....	.....
Los Angeles.....	26.95	.....	.....	.....	.....	.....
San Francisco.....	26.95	.....	.....	.....	.....	.....
Seattle.....	26.95	.....	.....	.....	.....	.....
Provo, Utah.....	22.00	21.50	.....	.....	.....	.....
Montreal.....	27.50	27.50	.....	28.00	.....	.....
Toronto.....	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace..... **\$23.50**

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron & Steel Co. may add another \$1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorus iron; high phosphorus sells for \$25.50 at the furnace.

(3) E. & G. Brooke Co., Birdsboro, Pa., permitted to charge \$1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh..... 21½ to 23½c.

Copper, reduced, 150 and 200 mesh..... 20½ to 25½c.

Iron, commercial, 100 and 200 mesh 96 + % Fe..... 13½ to 15c.

Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots..... 4c.

Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots..... 63c.

Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 33c.

Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe..... 42c.

Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe..... 90c.

Aluminum, 100 and 200 mesh..*23 to 27c.

Antimony, 100 mesh..... 20.6c.

Cadmium, 100 mesh..... \$1

Chromium, 150 mesh..... \$1.03

Lead, 100, 200 & 300 mesh, 11½ to 12½c.

Manganese, 150 mesh..... 51c.

Nickel, 150 mesh..... 51½c.

Solder powder, 100 mesh, 8½c. plus metal

Tin, 100 mesh..... 53½c.

Tungsten metal powder, 98%-99%, any quantity, per lb. \$2.60

Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb. \$2.60

Under 100 lb. \$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.88
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.50

*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges.



A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

**HARRISON
ABRASIVE
CORPORATION**
Manchester, New Hampshire

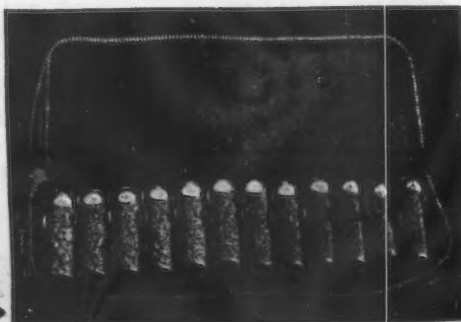
HEAT-TREATED STEEL GRIT

← HEAT-TREATED STEEL SHOT →

We manufacture
shot and grit for
endurance

Heat-Treated Steel Shot and
Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.



PRICES

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	\$64.60
First quality, Pa., Md., Ky., Mo., Ill.	51.30
First quality, New Jersey	56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	46.55
Sec. quality, New Jersey	51.00
No. 1 Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania and Birmingham	\$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	\$54.00

Magnesite Brick

Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	\$43.48
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	\$40.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points) Per Gross Ton	
Light rails (from billets)	\$40.00
Light rails (from rail steel)	39.00
Base per Lb.	
Cut spikes	3.00c
Screw spikes	5.15c
Tie plate, steel	2.15c
Tie plates, Pacific Coast	2.30c
Track bolts	4.75c
Track bolts, heat treated, to railroads	5.00c
Track bolts, jobbers discount	.63-5
Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.	

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c	20.40c
Bars	25.00c	24.00c
Plates	29.00c	27.00c
Structural shapes	25.00c	24.00c
Sheets	36.00c	34.00c
Hot rolled strip	23.50c	21.50c
Cold rolled strip	30.00c	28.00c
Drawn wire	25.00c	24.00c

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.325c	16.15c	19.125c	23.375c
Bars	18.50c	19.00c	22.50c	27.50c
Plates	21.50c	22.00c	25.50c	30.50c
Sheets	26.50c	29.00c	32.50c	36.50c
Hot strip	17.00c	17.50c	24.00c	35.00c
Cold strip	22.00c	22.50c	32.00c	52.00c

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c*
Sheets	19.00c*

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c
Armature	3.55c
Electrical	4.05c
Motor	4.95c
Dynamo	5.65c
Transformer 72	6.15c
Transformer 65	7.15c
Transformer 58	7.65c
Transformer 52	8.45c
F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.	

Planning Complicated PRECISION ASSEMBLIES?

ILLUSTRATION SHOWS
TELESCOPE ASSEMBLY
AND
SEPARATE PARTS



Take it to Federal Screw

This Army gunsight telescope assembly is being produced complete as shown at Federal Screw Works. Note close precision required.

Details: Tube—2" SAE 1015 steel tubing. Bore on each end held to .001" tolerance. O.D. ground to .0005" tolerance. Collars—SAE X1315 steel, carburized and hardened. Holes ground to .0005" tol. Adapter—SAE X1112. Has five I.D.'s. Largest bore held to .001" tol. Pin—SAE 52100; .219" dia. x 9/16", ground on O.D. to .0003" tol.

General: Rear end of tube and nose of adapter internally thread-milled; Class 3 fit. After assembly, collars must be concentric with bores within .001" indicator reading.

The same skill, experience and unexcelled manufacturing facilities which

permit the volume production of this high precision unit are available to you for post-war manufacture of screw machine products of all types and sizes. If your design calls for any or all screw machine and secondary operations—if hardening, grinding or plating are required—or if cold-heading or thread-rolling will do the job best—it will pay you to take it to Federal Screw. Without obligation on your part, let us give you an estimate—now.

Navy "E" Burgee
Awarded Jan. 31, '42

Army-Navy "E"
Awarded July 29, '42

4 Stars Have Since
Been Added to the
Army-Navy "E" Flag



Federal

SCREW WORKS

DETROIT AND CHELSEA, MICHIGAN
MAIN OFFICES: 3403 Martin Ave., Detroit 10, Michigan

LIONITE

MAKES
EVERY
MINUTE
COUNT

Yes, and every minute must count! Whether or not you are using Lionite polishing grains, are you using the correct size of abrasive for the job? Many polishing operations are slow and laborious because the proper size of grain has not been selected. The following case selected from our files will illustrate this point.

Job—To clean and polish castings in one operation
Grain formerly used—Size 70 aluminum oxide

Grain now used—Size 46 NB Lionite with cement
Comments—Size 70 aluminum oxide was recommended by another grain manufacturer. Production was not only very slow but wheels loaded and work burned.

General Abrasive engineer recommended and tested size 46 NB Lionite which increased production many times over and all castings came through clean and with satisfactory finish.

The services of our engineers are available without charge or prior commitment.

GENERAL ABRASIVE COMPANY, INC.
Lionite and Carbonite Abrasive Grains
NIAGARA FALLS, NEW YORK, U. S. A.



PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.
Carload lots (bulk)\$135.00
Carload lots (packed) 141.00
Less ton lots (packed) 148.50
\$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.
96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.
Carload, bulk 36c.
L.c.l. lots 38c.
95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.
Carload, bulk 34c.
L.c.l. lots 35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
16-19% Mn 19-21% Mn
3% max. Si 3% max. Si
Carloads \$35.00 \$36.00
Less ton 47.50 48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed.

	Eastern Zone	Central Zone	Western Zone
50% Si ...	6.65c.	7.10c.	7.25c.
75% Si ...	8.05c.	8.20c.	8.75c.
80-90% Si ...	8.90c.	9.05c.	9.55c.
90-95% Si ...	11.05c.	11.30c.	11.65c.

Spot sales add: 45c. per lb. for 50% Si, 3c. per lb. for 75% Si, 25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

(C/L, Per Gross Ton, base 6.00 to 6.50 \$t)
F.o.b. Jackson, Ohio\$29.50*
Buffalo 30.75*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorous or over.

*OPA price established 6-24-41.

Bessemer Ferrosilicon

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk.	3.35c.	3.50c.	3.65c.
2000 lb.-carload	3.8c.	4.2c.	4.25c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05c.
2000 lb. to carload	6.70c.
Under 2000 lb.	6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb. ...	5.80c.
2000 lb. to carload	6.30c.
Less ton lots	6.55c.

Ferrochrome

(65-72% Cr, 2% max. Si)
OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	22.50c.	22.90c.	23.50c.
0.15% C	22.00c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.00c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr			
4-10% C	13.00c.	13.40c.	14.00c.
62-66% Cr			
5-7% C	13.50c.	13.90c.	14.50c.

High-Ni
Low-cr
N. Add
ferrochrome
each add
type: 66
5c. per
chrome

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or 2%
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PRICES

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

	Carloads, Ton	Bulk	Less Ton
0.10% max. C, 1			
or 2% max. Si	23.00c.	23.40c.	23.65c.
0.15% max. C, 1			
or 2% max. Si	22.00c.	22.40c.	22.65c.
0.30% max. C, 1			
or 2% max. Si	21.00c.	21.40c.	21.65c.
0.50% max. C, 1			
or 2% max. Si	20.00c.	20.40c.	20.65c.
0.75% max. C, 1			
7.00% max. Si	16.00c.	16.40c.	16.65c.

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk..	8.25c.	8.55c.	8.95c.
Ton lots	8.75c.	9.25c.	10.75c.
Less ton lots...	9.00c.	9.50c.	11.00c.

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk..	6.05c.	6.30c.	6.60c.
Ton lots	6.55c.	7.55c.	8.55c.
Less ton lots...	6.80c.	7.80c.	8.80c.

Calcium—Manganese—Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si			
Add 0.25c. for spot sales.			
	Eastern	Central	Western
	Zone	Zone	Zone
Carloads	15.50c.	16.00c.	18.05c.
Ton lots	16.50c.	17.35c.	19.10c.
Less ton lots..	17.00c.	17.85c.	19.60c.

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

	Cast	Turnings	Distilled
Ton lots	\$1.80	\$2.30	\$5.00
Less ton lots...	2.30	2.80	5.75

Chromium—Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

Shot or ingot

Ferroboreon

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	\$1.20	\$1.2075	\$1.229
Less ton lots...	1.30	1.3075	1.329

Manganese—Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Ton lots ...	\$1.89	\$1.903	\$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.			
	Eastern Zone	Central Zone	Western Zone
11,200 lb.			
or more ..	\$1.90	\$1.9125	\$1.9445
Ton lots ...	2.00	2.0125	2.0445
Less ton lots	2.10	2.1125	2.1445

Other Ferroalloys

Ferrotungsten, Standard grade, lump or 1/4X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more....

\$1.90

Ferrovandium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.

Open hearth

Crucible

Primos

\$2.70

\$2.80

\$2.90

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal.....

\$1.50

Vanadium pentoxide, 88%-92% V₂O₅ technical grade, contract basis, any quantity, per lb. contained V₂O₅. Spot sales add 5c.

per lb. contained V₂O₅.....

\$1.10

Ferroboreon, contract basis, 17.50% min., Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy.

2000 lb. to carload.....

Under 2000 lb.....

\$1.20

1.30

Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)

Carload lots

2000 lb. to carload.....

26c.

Silicaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)

Carload lots

2000 lb. to carload.....

58c.

59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis

No. 1

No. 6

No. 79

\$7.5c.

60c.

45c.

Bortram, f.o.b. Niagara Falls

Ton lots, per lb.....

Less ton lots, per lb.....

45c.

50c.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.

2000 lb. lots.....

Under 2000 lb. lots.....

\$2.25

\$2.30

Ferrotitanium, 40%-45%, 0.10% C, max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti..

Less ton lots

\$1.23

\$1.25

Ferrotitanium, 20%-25%, 0.10% C, max., ton lots, per lb. contained titanium

Less ton lots

\$1.35

\$1.40

High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload.....

\$142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton.....

\$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Silo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton

\$75.00

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.

Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.

80c.

Molybdenum oxide briquettes, 48-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo.....

80c.

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo.....

80c.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 1/4c. for spot sales

Carload lots

14c.

Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy

Carload, bulk

4.6c.

Alstifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk

5.75c.

7.25c.

Ton lots

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.

Car lots

3.75c.

9.25c.



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